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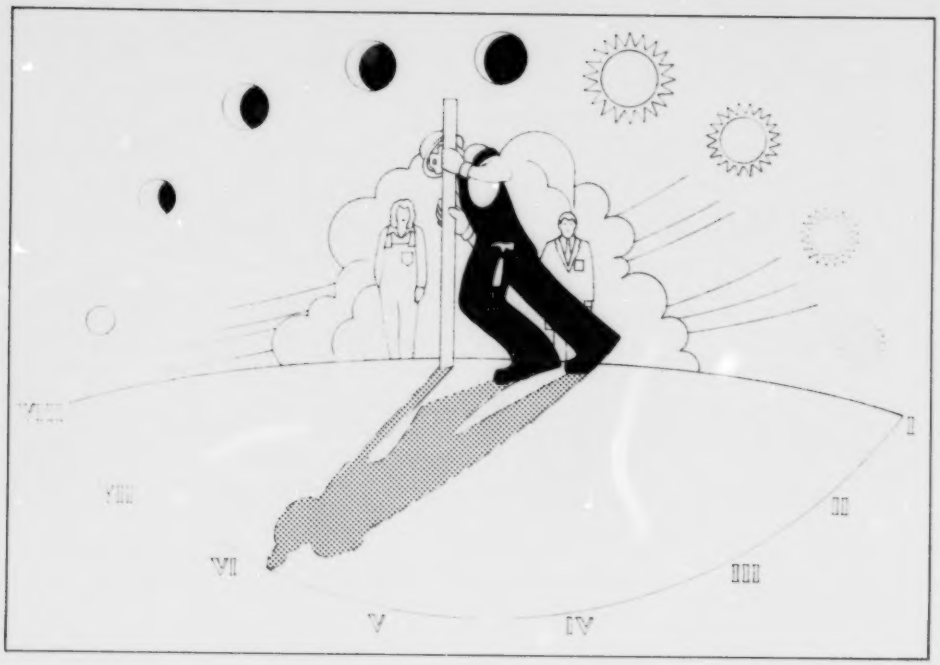

The Prospects for Creating Jobs by Reducing Hours of Work in Ontario

THE PROSPECTS FOR CREATING JOBS BY REDUCING HOURS OF WORK IN ONTARIO

by

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(A Report Prepared for the Ontario Task Force on Hours of Work and Overtime)

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Abstract: The Prospects for Creating Jobs by Reducing Hours of Work in Ontario

This paper examines policies designed to create jobs in Ontario by reducing hours of work. Policies to reduce the standard workweek are examined and found to be of little value in the Ontario context. Limiting overtime by permits is argued to have been ineffective in the past and unlikely to be effective in the future. Policies to reduce overtime by increasing the overtime premium appeared more encouraging at first glance, but illustrative calculations for Ontario suggest limited scope for job creation here either. We calculate that an increase in the overtime premium to double time after standard weekly hours would give rise to about a 0.25 per cent increase in employment though this would be offset as a consequence of the increase in the cost of labour so that the net increase would be on the order of 0.1 per cent of total employment. Similar illustrative calculations for an alternative policy of a marginal employment subsidy suggest that there are far more effective ways to create jobs than by reducing overtime hours.

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THE PROSPECT FOR CREATING JOBS BY REDUCING HOURS OF WORK IN ONTARIO

INTRODUCTION

In recent months, considerable attention has been focussed on the amount of overtime hours being worked in Ontario. In particular, concern has been expressed about the appropriateness of using extensive overtime when unemployment levels are considered to be high. This focus on the overtime-unemployment relationship appears to be part of a larger debate about worksharing programs in general. In the absence of appropriate macro-policies to reduce unemployment, for example, it has been argued that the burden of the existing unemployment could be distributed more equitably by implementing some form of worksharing. Measures such as reductions in overtime, reductions in the standard workweek, increased part-time employment, or increased jobsharing have all been proposed.

This paper examines the theoretical and empirical evidence relating to two of these proposals -- reductions in overtime and reductions in the standard workweek -- with respect to their potential impact on job creation.[1] It then builds on this information to provide some empirical estimates of the likely impact of such policies in Ontario.

To put the issues in their proper perspective, a number of points about these policies are worth noting at the outset. In the first instance, although reductions in overtime and in the standard workweek are similar in the sense that they will both reduce the full-time working week, we argue that they are designed to address quite different aspects of the unemployment problem. There is evidence to suggest, for example, that the use of overtime is cyclical, and that overtime use is a leading indicator of the business cycle (see Hamermesh and Rees, 1984, p.133).

A possible explanation for this phenomenon is that, as the economy moves out of a recession, uncertainty about the strength of the recovery might induce employers to use overtime instead of new hires, particularly if the quasi-fixed costs of the latter are high. Irrespective of the reason for the firm's behaviour, however, the empirical evidence on the pro-cyclical nature of overtime use suggests that a policy to reduce overtime may well have its biggest impact in the upswing portion of the cycle. In fact, such a policy could (and perhaps should) be designed to be in effect only at this phase of the cycle for the purposes of reducing short-term cyclical unemployment.[2]

Reductions in the standard workweek, however, are much more irreversible and certainly could not be activated (unlike reductions in overtime) at various points in the business cycle. To argue for such a policy as a measure to create jobs, therefore, seems to imply that there has been some increase in long term joblessness, perhaps owing to technological change, for example. In other words, a policy to reduce the standard workweek is perhaps best thought of as a policy designed to lower the long term 'natural' rate of unemployment as opposed to affecting short-term cyclical unemployment.[3]

The two policies also differ in terms of where they have attracted attention as a policy issue and, hence, where the available literature originates. The seminal work on overtime, for example, originates in the United States, while the European contributions to this literature are limited and comparatively recent. The reverse is true for the literature on reductions in the standard workweek, and, as will be seen later, this has important implications for the usefulness of these models in making predictions for Ontario.

The major U.S. contributions to the overtime hours debate have been made by Ehrenberg (1971), Ehrenberg and Schumann (1982), and Nussbaum and Wise (1978). (A review of this literature is given in the following section of this paper.) Much of this work was directed at determining the employment effects of reducing the use of overtime through proposed increases in the overtime wage premium (from-time-and-one-half to double time). The basic argument in the Ehrenberg and

Schumann work is that the growth of quasi-fixed labour costs are a major factor in the demand for overtime hours in the United States. Using econometric techniques, they estimate the relationship between overtime hours and the ratio of quasi-fixed to variable costs and use the results to estimate the effect on overtime hours of changes in the overtime premium. The process of inferring the effect of these changes on employment, however, is noneconometric. An upper-bound effect is calculated by translating reduced hours into new jobs on a one-for-one (i.e., hour-for-hour) basis. This is a maximum effect and would be reduced if a number of slippages occur. One major slippage emanates from any reduction in total hours as a consequence of the increase in the average cost of labour this can result from a substitution of capital for the higher-priced labour and from a reduction in the scale of output from the higher labour costs. A second slippage occurs if jobs so created will be filled by the unemployed either because the unemployed do not have the appropriate skills or because moonlighters get the jobs rather than the unemployed. In any event, the translation from overtime hours to jobs is not based directly on estimates from the historical record. That is, on direct measurements of historical substitutions that have taken place in response to changes in the ratio of fixed costs to variable costs. Rather, the approach relies on indirect evidence such as Hamermesh's (1976) summary estimate of the elasticity of demand to make these inferences.

Much of the recent European work on overtime has been done in the context of analyzing the employment and hours effects of reducing the standard workweek when substitution into overtime hours is a possibility. Unlike Ehrenberg's work, the work by Hart and associates[4] does attempt to let the historical record provide direct evidence on the substitution between hours and employment. Equations for both the hours per employee and the number of employees are estimated (at least where data permit). Both of these depend on the ratio of fixed cost to variable cost; when it changes, inferences can be made directly about both overtime hours and employment. In principle, one can work backwards to the production structure and to the elasticity of substitution. This approach is consistent with the estimation of production structures going on in other branches of

economics (for example, in the highly publicized debate over the substitutability of energy and capital).

At the same time, this work has not progressed very far in terms of the degree of empirical sophistication, such as the inclusion of cross-equation restrictions or the incorporation of a dynamic structure. In addition, both the theoretical and empirical literature assume that standard hours are exogenous to the firm, an assumption which is not entirely appropriate for Ontario firms. Further, because of the European interest in the possibilities of reducing standard hours, much more attention has been given in the empirical work to estimation of the responses to that policy change than to the estimation of the response to relative prices (the fixed cost-wage ratio). For these reasons, therefore, it is not clear at this stage that the results from the European literature are useful in trying to estimate the impact of policies in Ontario.

The employment effects of reducing the standard workweek have been analyzed under a number of different modelling approaches. In the third of this paper, we review the theoretical and empirical results of two of these models: (1) conventional cost-minimizing, profit-maximizing labour demand models which assume predetermined wages to the firm; and (2) macro-forecasting models. As will be shown in that section, the theoretical and empirical literature on the reduced standard workweek does not justify optimism in terms of employment creation. The literature do suggest one interesting result, however. The job-creation predictions from the optimizing models differ depending upon whether or not the firm is using overtime hours in equilibrium. Thus, to the extent that some firms in the Ontario economy use overtime while some do not, the estimated job-creation impact will depend (in the absence of detailed data and analysis) on what guesses one can make about the net effect of reducing standard hours in all firms.

In the fourth section of the paper, using estimates from the existing literature, we present illustrative calculations of the job-creation impact of reductions in overtime. Five alternative policies are considered: (1) outright restrictions on all overtime, (2)

raising the overtime premium to double time for overtime hours, (3) raising the overtime premium to double time after 44 hours per week, (4) raising the overtime premium to double time after 48 hours per week, and (5) employment subsidies for new hires.

The final section of the paper provides a summary and outlines the conclusions of the study.

THE MODELLING OF HOURS OF WORK AND OVERTIME

The framework that has generally been used to analyze the choice of employers between more employees and longer hours is rooted in the distinction between the costs of hiring another worker and the costs associated with working an existing worker longer hours.[5] The costs associated with hiring another worker are generally referred to as fixed (or quasi-fixed) costs (since they don't vary with hours of work) and include the following: hiring costs, turnover costs, statutory payments that vary with the number of workers but not with their hours (for example, statutory holidays or workers' compensation), and contractual payments (such as annual paid holidays or medical or dental insurance) that vary with the number of workers but not with their hours.[6] The costs of working the workforce longer hours is generally taken to be the overtime wage rate (at least for firms working overtime) though, in principle, any extra costs incurred as a consequence of working these longer hours should be included (for example, maintenance may be more difficult and, hence, more costly when long hours are being worked).

Of course, if another hour worked by an existing or a new employee had the same productivity, then an optimizing firm would simply choose the least costly alternative; therefore, some productivity distinction is required to provide a model that has firms selecting an optimal length of work time and an optimal number of employees. The way this has typically been modelled is to assume that output is produced by other factors together with labour services. These, in turn, are produced by hours and workers. To make this point more concrete, suppose that the production function is given by

1) Output = f (capital, materials, labour services),

while labour services are in turn given by

2) Labour Services = g (workers, hours).

If the labour-services function simply had as its argument the product of workers times hours per worker, then the two would have equal productivity, and an optimal mix of workers and hours would not emerge as a solution. Thus, they are treated as separate arguments in the labour-services function -- quite frequently in a Cobb-Douglas form.[7]

In addition to the two features outlined above (the distinction between fixed costs and variable costs and the differential treatment of hours and workers in the production function), one additional feature has invariably appeared in these models:the assumption that the standard workweek is exogenous to the firm. On the one hand, this greatly simplifies the modelling[8] while, on the other, it is not unreasonable for the analysis of short term policy options.[9]

For the purposes of this study, however, it is the comparative statics of the model that are of interest; that is, how the choice variables in the model change in response to the exogenous variable in the model. These effects allow one to assess policy options. The remainder of this section, therefore, will concern itself with the responses of overtime and employment to relative price variables (the overtime premium and the fixed-costs variables), while the next section will discuss the issue of legislated changes in the standard workweek -- the key policy option that emerges from the European literature.

Most of the theoretical modelling that looks at the effects of changes in relative prices (the overtime premium or the fixed costs variable) does so in the context of a very restricted model.[10] In particular, labour services are considered to be the only variable factor and the framework is assumed to be one of cost-minimization. Thus, as output is constant, labour services must also be constant. There are no scale effects (that would accompany a change in the level of output), and the only substitution allowed for is between hours and workers. In such a model, the responses of a firm are unambiguous. Anything that increases the cost of an additional hour

relative to the cost of an additional worker will cause an unambiguous shift from long hours to more workers.[11] Thus, an increase in the overtime premium or in the wage (with the overtime premium fixed) will cause an increase in employment and a reduction in hours. The other side of the coin is that a reduction in the fixed-cost component will act in much the same way -- increasing the use of workers and reducing the number of hours worked per person.

There are two major features that need to be added to such a model to make it useful for policy purposes: Other factors of production need to be incorporated, and output needs to be allowed to vary. When additional factors of production are considered, increases in either the wage, the overtime premium, or the fixed cost of a worker will lead to a substitution toward alternative factors and away from labour services in general. Similarly, an increase in any of these costs increases marginal costs[12] and will induce a fall in output which will bring with it reductions in labour services and their components. Thus, the clean and unambiguous effects reported in much of the literature are muddied by these additional considerations. One might assume that, as in a general factor demand model, these complications only ameliorate but do not make ambiguous any of these effects. Unfortunately, it is a bit more complicated than that. An increase in the overtime premium or the wage rate changes two prices, not just one. Both the cost of an additional worker and the cost of an additional hour are affected. This leads to the possibility (though unlikely) of ambiguous responses. On the other hand, the fixed-cost increase is analogous to a price increase in a regular factor demand model, and increases in it should lead to unambiguous effects on the number of workers (though not on the number of hours).

In any event, to evaluate policy, empirical estimates of the responses are needed. It is with this in mind, therefore, that we turn to an evaluation of the empirical estimates of the responses of hours and workers to variations in their relative prices. Unfortunately, however, when it comes to these price responses, the empirical work is quite thin. This partly reflects the fact that

much of the work has been done in Europe, where not much interest has been shown in price responses.

If one approaches this empirical literature from the background of production function, cost function, or factor demand function estimation, one is immediately struck by the simplicity of the modelling and estimation. Much of this presumably stems from the paucity of data (on fixed costs in particular).

The work can be grouped into two main types.[13] On the one hand, Ehrenberg (1971), Ehrenberg and Schumann (1982), Laudadio and Percy (1973) and Nussbaum and Wise (1978) focus on the equation for overtime hours (since the data sets that provided them with good detail on hours of work per worker and fixed and variable labour costs, had no information on the scale of operation -- either on workers, or on output).[14] The use of these models to study the issue of substitution between overtime and employment requires the translation of any estimated reduction in overtime hours into an estimate of new jobs. This means using information from other sources and other models, which makes the analysis not entirely satisfactory.

A second strand, which might be thought of as the European strand and which is best exemplified by the work of Hart and his associates,[15] attempts to estimate the equations for both hours and workers. Here, although the work is varied, it would be reasonable to say that the effort has been directed more toward providing good estimates of the response of hours of overtime and workers to variations in the standard workweek, at the expense of not-so-good estimates of the relative-price responses. That is, although the models recognize that the relative price term should appear and the authors include it when data are available, if the estimated elasticities are not very good, then no great effort seems to have been devoted to them.

A good example of this approach is the recent Hart and Wilson (1986) study, which seems to have better data than most of the other studies. Here, the fixed-cost/variable-cost term in the total hours

equation and in the overtime hours equation had the "wrong sign" (pointed out by the authors). In the employment equation, this term had the correct sign and seemed quite robust across the five cross-sections reported, though its magnitude seems rather large to us. The implied employment reduction caused by going from time-and-one-half to double time is about 7 per cent (25 per cent times 0.28),[16] compared to estimates elsewhere on the order of 0.5 to 2 per cent (for example, Laudadio and Percy (1973) for Canada and Ehrenberg and Schumann (1982) for the United States) as the maximum effects. To be sure, this is a single U.K. industry being compared to North American aggregates, so there is some room for differences. In any event, the poor performance of the fixed-cost to wage ratio variable in the hours equations throws these responses into doubt.

In most of the other studies in this vein, either the elasticity of workers with respect to the relative-wage to fixed-cost term is missing (data limitations) or inadequately determined. In fact, it is hard to pinpoint a single study, in this factor-demand system approach, where data have been available so that all parameters could be estimated, and where all estimated parameters are reasonable in sign and magnitude. The fixed-cost to variable-cost parameters seem most troublesome (and most often not available).[17]

In light of these considerations, we will rely mainly on the Ehrenberg and Schumann approach and their elasticity estimates for our calculations when we attempt to make some rough estimates later in this paper.

EMPLOYMENT EFFECTS OF REDUCING THE STANDARD WORKWEEK

As indicated earlier, a reduction in the standard workweek has also been proposed as a means of worksharing in Ontario. It is the purpose of this section, to review briefly the theoretical and empirical literature on the employment effects of such a policy.

At the outset it is important to note an important caveat with respect to the literature on the reduced workweek. The bulk of this work has been done in Europe where, for the most part, the standard workweek is exogenous to the firm; that is, it is legislated by

government or dictated by social custom. This is not the case in Ontario. Only maximum hours (48) are legislated, and the standard workweek is endogenous. Evidence shows, moreover, that there is considerable variation by industry in usual (standard) hours.[18]

The implications of these points for the analysis are two-fold. First, considerable caution should be exercised in assuming that the predictions from the European literature (which assume standard hours to be exogenous) are appropriate for Ontario. Second, even if the case could be made that the models are useful in the Ontario context (for predicting short-run responses, for example), it is not at all clear how one could make sensible empirical estimates of the employment effect. With no legislated workweek to reduce, the government would have to bring in the policy by stating that no more than (for example) 35 hours constitute the standard workweek. Because of the existing diversity in current standard hours, might imply large reductions, small reductions, or no reductions at all in standard weekly hours, depending on the firm. There would probably be serious efficiency problems as well. The firms that are least able to adjust to shorter hours are likely to have to do the greatest amount of adjustment since the fact that they are least able to adjust is what leads them to longer hours in the first place.

In such a case, sensible predictions with respect to changes in the relative price of employment to hours, productivity changes, and increases in unit labour costs would be difficult to determine in the aggregate. Hence, the aggregate employment effects would also be difficult, if not impossible, to predict. For this reason, as well as for the fact that a policy with such inefficiencies is unlikely to be of much further interest, no illustrative calculations on the employment effects of a reduced workweek have been undertaken in this paper.

Bearing this problem in mind, therefore, the remainder of this section outlines the main theoretical and empirical work in the area of reducing the standard workweek. We note that most of this literature has recently been surveyed by Hart (1986a), and this section draws very heavily on his work.

Reductions in the Standard Workweek: Theory and Evidence

The economic theory of hours and employment has been developed under a number of different modelling approaches. Hart identifies five of these: (1) conventional cost-minimizing/profit-maximizing labour demand models with predetermined wages; (2) efficiency wage models where hours reductions are analyzed within a model in which the firm sets the wage; (3) union bargaining models, where a large monopoly union is assumed to set the wage while the firm sets the level of employment; (4) implicit contract models; and (5) macro-economic forecasting models. The empirical work in this area, however, is based almost exclusively on the conventional labour demand models (1) and the macro models (5). For this reason, and because we assume that the assumptions of wage setting and union monopolies are less appropriate for Ontario firms, this section focuses on the results from categories (1) and (5).

Effects of Reductions in Standard Hours in Conventional Labour Demand Models with Predetermined Wages

A cost minimizing model analyzes the firm's reactions to changes in factor prices on the assumption that the level of output it produces remains constant. That is, the model allows only for substitution effects between the inputs and not for any scale effects which result when the overall level of output is changed. In the simplest case, we consider a firm which is working overtime in equilibrium, which has a fixed capital stock, and which pays some given straight-time wage for standard hours and some multiple of this for overtime hours. In this case, if standard hours (assumed to be exogenous) are reduced, there will be an unambiguous increase in the number of average-per-period hours per worker, and a fall in employment levels (Hart, 1986a, Chapter 5). That is, the firm will substitute more overtime hours per worker for fewer workers. The reason for this is that the reduction in standard hours changes the relative price (at the margin) between additional hours and additional workers. More precisely, the marginal labour cost of an additional worker rises relative to the marginal cost of an additional hour because the fraction of total hours compensated at the (cheaper) straight-time wage is now smaller.

Relaxing the assumption that the firm is working overtime in equilibrium, however, gives quite different predictions with respect to employment. In firms in which the workers are working only standard hours, a reduction in the standard workweek results in three possible outcomes: (1) if the firm remains at a corner solution (i.e., the increase in the relative price of workers is still not sufficient to induce the firm to use overtime), employment will increase; (2) if the firm was originally working fewer average total hours than the standard workweek, then the reduction in standard hours may have no effect on employment; (3) if the reduction in standard hours is very large, then the employment effect is ambiguous; large changes in relative prices may move the firm from a corner to an interior solution.

If we now assume profit maximizing for the firm, then the employment responses of a change in standard hours are made even less favourable. This occurs because the negative scale effects (increased unit labour costs result in reductions in the whole scale of operations) reinforce the substitution effects. For firms which work overtime in equilibrium, therefore, the employment effects of a reduced workweek will be negative as in the cost-minimizing case. For firms which do not use overtime in equilibrium, however, the employment response is now ambiguous. In this case, the positive substitution effect is offset by a negative scale effect, and the net result is not known a priori.

Variations in the Conventional Labour Demand Model

Before turning to the literature on the empirical testing of the labour demand models, it is worth noting, for completeness, the predicted employment effects for reductions in the standard workweek using slightly different assumptions in the conventional model. Three cases are considered: (1) variations in the capital stock; (2) the separation of overtime hours and standard hours in the labour services function; and (3) incorporating the assumption that only a fraction of the firm's labour force chooses to work overtime.

If the capital stock is allowed to vary, then the employment effects of reductions in the standard workweek are qualitatively unchanged from those in the cost-minimizing model with fixed capital stock. That is, a reduction in standard hours will result in the firm's reducing the number of workers but increasing the hours worked per worker. There will also be an increase in the firm's capital stock. This occurs because the fall in standard hours raises the price of workers relative to both hours and capital, so that the firm can now substitute into either (or both) of these inputs. Introducing capital utilization (i.e., the number of shifts) separately into the production function does not alter these basic results. Work by Calmfors and Hoel (1985), for example, shows that standard hours reductions are likely to increase capital utilization and reduce employment.

In the second case, we note that in the conventional labour demand model there is an assumption that the marginal product of total hours is independent of the distribution of these hours between standard and overtime working hours. Relaxing this assumption by entering standard and overtime hours separately into the labour services function gives the following results: a reduction in standard hours increases equilibrium total hours (as in the conventional model), although the employment effect is now ambiguous. A favourable employment effect results only under the assumption that the marginal productivity of overtime hours is lower than the marginal productivity of standard hours (an assumption not uniformly accepted in the literature). In such a case, although labour utilization rises, the additional usage of (assumed) less efficient overtime hours is insufficient to compensate for the production loss created by shorter standard hours, and employment increases (Santamaki-Vuort (1986), Chapter 6). Note again, moreover, that these results should be treated with caution, as they allow for no scale or capital substitution effects.

A final variation worth noting is the case in which the amount of overtime is unevenly distributed among workers and a proportion of workers choose to work only standard hours. There are two noteworthy

results from this model: (1) in the general case, the employment/hours effects of a reduction in the standard workweek are ambiguous. (2) Assuming a specific functional form of the production function (constant elasticity), the reduction in standard hours increases both employment and the average number of hours worked by those employees who are willing to work overtime.

In summary, the current theoretical literature does not justify optimism about the potential employment effects of a reduction in the standard workweek. In most models, the predicted effects are negative or ambiguous, with positive effects occurring only under stringent assumptions about the nature of the production function, or about the relative efficiency (in terms of output) of using overtime hours as opposed to standard hours. We turn now, therefore, to the empirical evidence in this area.

Employment Effects of Reductions in the Standard Workweek: Empirical Evidence

A large part of the empirical analyses of standard-hours reductions has used the labour demand model approach. While the underlying theory in this model is at the firm level, most of the testing (with two notable exceptions) has been done using aggregate data -- economy - or industry-wide.

The equilibrium labour demand functions derived from the cost-minimizing model outlined above are an hours equation (average total per-period hours per worker estimated as a function of standard hours, the ratio of fixed to variable costs, the quit rate, and a vector of control variables) and a workers equation (number of workers estimated as a function of standard hours, the ratio of fixed to variable costs, the quit rate, a vector of controls, and output). Using this framework, the evidence on the hours/employment impact of reductions in the standard workweek appears inconclusive. Work by Hart and McGregor (1985) (using data on manufacturing industries for the Federal Republic of Germany (FRG), 1969-1981) and Hart and Sharot (1978) (using monthly data on aggregate British manufacturing industries, 1961-1972 shows that the standard hours variable is insignificant in the workers equations. Earlier work by Brechling

(1965), on the other hand (using quarterly data on aggregate British manufacturing industries, 1950-1962), found standard hours to be significantly and negatively related to employment, although this result was not robust when a capital stock variable was introduced into the equation.[19]

With respect to the hours equation, the literature also suggests some inconsistency in the findings on the size of this effect. The work of Hart and McGregor (1985), for example, show a total hours/standard hours elasticity of greater than one; that is, a reduction in standard hours results in a more than proportionate fall in total hours through less overtime working, a finding supported by the work of Ehrenberg (1971). The analyses by Hart and Sharot (1978) and Neale and Wilson (1985), on the other hand, suggest that this elasticity is less than one; that is, part of the reduction in standard hours is compensated for by increased overtime.

Turning to the available micro-evidence on standard hours reductions, we find that two very recent studies using establishment-level data for the U.K. provide some interesting results. In the first study (see White (1983) and White and Ghobodian (1984)), a cross-sectional analysis of 218 industries examined the employment and hours reactions to cuts in standard hours in order to determine the importance of changes in labour productivity on these variables. The results from this study, as outlined by Hart (1986a, Chapter 6), are as follows: (1) there appears to be no evidence that reductions in working time led to increases in employment, mainly because hourly productivity tended to increase to compensate for the reduction in working hours; (2) some firms actually reduced employment as a means of obtaining the productivity increases needed to compensate for the reduction in working time; (3) there was some evidence that overtime hours started to grow but it was unclear whether factors other than the introduction of shorter hours could have been partially responsible for this; (4) on balance, shorter hours lead to higher labour costs because the increase in productivity did not fully offset the reduction in working hours and because of additional overtime.

In the second study, by Hart and Wilson (1986), a detailed cross-sectional analysis of 52 enterprises in the U.K. metalworking industry (with the sample split into those firms that worked overtime and those firms that did not) provided the following results: (1) the estimated total hours/standard hours elasticity is less than one, and the magnitude (0.76) is similar to that obtained by Neale and Wilson (0.67); (2) similar to the results found by Hart and Mcgregor (1985) for the FRG study, the effect of changes in standard hours was found to be insignificant in the workers equations, when all enterprises were considered together. When the relationship was tested separately on firms that did, and firms that did not, use overtime, however, it was found that there was a significant and positive relationship between standard hours and employment in industries that do use overtime, but a significant and negative relationship between standard hours and employment in those industries that do not use overtime -- a result predicted by the simple cost-minimizing model.

Reductions in the Standard Workweek: Empirical Evidence from Macro-models

An alternative way of determining the employment effects of a reduction in standard hours is by simulating in a large-scale econometric model. A recent paper by van Ginneken (1984) reviews the results of such simulations from seven European econometric models. Essentially, van Ginneken attempts to standardize the results for the models under review by estimating the employment elasticity based on a 1 per cent reduction in the length of the workweek. The employment elasticities, moreover, are calculated under two hypotheses: the first assumes that there is no wage compensation for reductions in standard hours; and the second assumes that there is full wage compensation for a reduction in standard hours. While we do not attempt to survey these results in any detailed fashion (for reasons discussed below), the general conclusions are as follows: (1) only one model (the Vintaf model for the Netherlands) found negative employment elasticities (-0.08 to -0.19), and these were for the model assuming full wage compensation for a reduction in standard hours. (2) On the positive side, positive employment elasticities in the following ranges were found: (1) 0.6 to 0.8 in the two French

models and in the FRG model; (2) 0.05 to 0.28 in the U.K. Treasury model. Both van Ginneken (1984) and Hart (1986a) express skepticism about the results from the two French models and the FRG model. In the case of the French DMS model, for example, the predicted employment effects were much larger than the employment effects which actually occurred after the reduction of the standard workweek in January, 1982. Also, the FRG model and the French Metric model stipulate that investment depends only on an anticipated increase in demand -- a simple specification which is thought to lead to an overestimate of both the investment and the employment responses.[20]

A more general criticism of the macro-models in the hours employment context, however, is given by Santamaki-Vuori (1986) who points out that the large-scale models do not model with any accuracy the underlying labour market relationships. In particular, the models do not separate the two components of the labour input and they do not accurately measure the ratio of the fixed to variable costs. This criticism certainly applies to the Canadian macro-models reviewed in Appendix B of this paper, which do not view the determinants of hours and employment in the fixed-cost variable cost framework at all. More importantly, some of the Canadian models make no distinction between employees and hours, and those that do have a type of trend equation for average weekly hours that can be divided into total labour demand (say in person hours) to arrive at employment. For these reasons, the Canadian macroeconomic models seem to preclude estimating any of the direct substitution responses of hours for workers.

In summary, it appears that the empirical literature, like the theoretical literature, on the employment effects a reduction in the standard workweek, does not justify optimism about this policy. The evidence based on the partial equilibrium approach to the problem seems to indicate that reducing standard hours may not increase, and may even reduce, employment levels; firms compensate for the drop in hours by using more overtime. The work by Hart and Wilson (1986), however, does show that in firms not using overtime in equilibrium, employment levels do seem to increase on average after a reduction in standard hours -- a result predicted from the cost-minimizing model.

Whether or not employment would increase in the economy as a whole, therefore, is dependent on the net effect of the two types of response.

The predictions from the macroeconomic models seem to indicate a small employment effect from a reduction in standard hours, but the lack of appropriate modelling of the underlying labour market relationships suggests that any results from the macro-models should be treated with extreme caution.

THE POTENTIAL FOR JOB CREATION IN ONTARIO BY LIMITING OR REDUCING OVERTIME

Some Illustrative Calculations

In this section, we examine quantitatively the potential for creating jobs in Ontario by limiting the use of overtime. We begin with an overview of the hours of work in the labour market in Ontario. This provides a background to the calculations reported later in this chapter. Table 1 provides annual averages (of monthly data), for the last 11 years, on usual hours, actual hours, and extra hours from the Labour Force Survey.[21] The Labour Force Survey (hereafter, LFS) is the only source of historical information on hours of work in Ontario that spans more than a few years. Unfortunately, it is a less than ideal source of data for the task at hand. Two major deficiencies can be noted. First because this is a survey of individuals, the information is based on the individual's (or some family member's) recall, interpretation of the question, and reporting. Thus, the "actual hours" data depend on a response to the question "How many hours did...actually work last week at his/her job." "Usual hours" follow from a similar question that asks about hours usually worked rather than actually worked, and "extra hours" data come from a question that asks "last week, how many hours of overtime or extra hours did...work? (include paid and unpaid time at all jobs)."[22] Clearly, none of these questions provides information accurately on the specific issue of overtime.

The second major deficiency in the data (for our purposes) is that no distinction is made that would allow one to separate out

Table 1: Trends in hours of work in Ontario, 1975-1985

Year	MAIN JOB				Average Extra Hours‡‡	Extra Hours per Worker	Total Employed	Percentage with Extra Hours
			FULL TIME					
	Usual Hours	Actual Hours‡	Usual Hours	Actual Hours				
1975	37.5	37.1	40.5	40.0	8.0	0.92	3277.7	11.6
1976	37.5	36.5	40.5	39.4	8.1	0.86	3341.3	10.6
1977	37.4	36.6	40.5	39.6	8.2	0.90	3372.5	10.9
1978	37.5	37.2	40.6	40.2	8.1	0.93	3473.4	11.4
1979	37.4	37.4	40.7	40.7	8.1	0.96	3621.3	11.8
1980	37.3	36.9	40.6	40.2	8.0	0.93	3691.2	11.6
1981	37.2	36.4	40.6	39.7	8.1	0.97	3806.9	11.9
1982	37.0	36.3	40.5	39.8	8.1	0.88	3706.7	10.8
1983	37.0	36.6	40.8	40.4	8.1	0.96	3727.3	11.8
1984	37.0	36.8	40.8	40.5	8.2	1.04	3859.6	12.6
1985	37.1	36.9	40.9	40.6	8.3	1.07	4003.1	12.9

‡ The average for actual hours is calculated over those at work; that is, having hours greater than zero.

‡‡ averaged over those working extra hours.

Source: Special tabulations by Statistics Canada from the Labour Force Survey.

workers who are covered by the Employment Standards legislation from those who are not. For example, data collected from employers (in the Survey of Employment, Payrolls and Hours; hereafter, SEPH) make a distinction between hourly paid workers and salaried workers. While this distinction is not the same as the distinction between covered and noncovered groups, there is a much closer accord between the hourly paid workers and covered workers than between all workers (reported here) and covered workers.[23] As a consequence, one should bear in mind that the numbers shown as employed in these LFS-based tables are on the order of double the numbers that could be expected to be affected by any changes in the legislation.[24] On the other hand, there is no reason to believe that the figures on weekly hours, or, more particularly, on their trends, are unrepresentative of the hours of covered workers.

With these caveats in mind, we note the following features from Table 1. Average usual hours and average actual hours (in the worker's main job) actually fell slightly over the period in Ontario, while the average usual hours and actual hours rose slightly (about 1 per cent over the 11 years) for those working full time. This suggests that it is the increased participation of part-time workers that leads to the apparent reduction in average hours for the labour force as a whole. At the same time, we note an increase in the extra hours columns. Average extra hours (the average worked by workers who work extra hours) increased by about 4 per cent (from 8.0 to 8.3 hours per week) while extra hours per worker (averaged over those who worked plus those who did not) rose about 16 per cent over the period (0.92 to 1.07 hours per worker). This last figure reflects the growth, reported in the last column, of the fraction of workers who are working extra hours. Thus, the LFS data suggest a considerable increase in long hours of work, that is, in hours of work, (that exceed normal or standard hours of work) over the period in question.

A similar message is contained in Table 2, which reports on the issue of 100-hour permits and special permits in Ontario. The 100 hour permits allow employers to work their covered employees 100-hours per year beyond the legislated limits (8 hours per day, 48 hours per week). The special permits are required for covered

Table 2: Overtime permits in Ontario, 1981-82 to 1985-86

Fiscal year	Number of 100 hour permits issued	Maximum hours approved in special permits	Job equivalents of excess hours in special permits*
1981-82	211	157960	86
1982-83	180	239305	131
1983-84	294	875950	478
1984-85	374	1205545	658
1985-86	435	956280	522

* Job equivalents are calculated at average actual hours over the period, 36.6%, and on the assumption of a 50 week year. Over the period, average hours varied only slightly between 36.3 and 36.9.

Source: Tables provided by the Employment Standards Branch, Ontario Ministry of Labour.

employees who work beyond the 100-hour limit (on an annual basis, roughly 50 hours per week). The data are reported on a government fiscal year and indicate considerable growth in both the number of 100-hour permits issued[25] and the maximum hours approved in special permits. This provides some confirmation of the growth in long hours suggested by the LFS data.

Nevertheless, caution must be exercised in using the numbers reported in Table 2 for purposes other than to indicate a trend. The degree of noncompliance, especially involving the special permits, seems likely to be quite high.[26] We have been led to this view by some comparisons between the number of hours that seem to be needed in special permits (to make the very long hours actually worked in Ontario legal) and the number of hours allowed for as a maximum (reported in this table). We report these calculations in Appendix A, on special permits, and conclude there that special permits would need to be issued for at least 25 times as many hours if full compliance were to be achieved.[27]

Table 3 reports some detail on the distribution of both usual and actual hours of work for 1985, the latest complete year of LFS data. From Table 3 we note that a large fraction of the long hours that are worked represents usual hours of work. For example, the ratio of the number of employees reporting usual hours of work in excess of 59 (60+) to the number reporting actual hours in excess of 59 is 0.85. About 85 per cent of those working these very long hours, usually do so. Moreover, though women do not work long hours to the extent that men do, a similar relation between usual long hours and actual long hours is evident.

Table 4 reports details on extra hours from the LFS. Since the survey question deals with both paid and unpaid hours, it is useful to note that by far the bulk of those reporting extra hours (90 per cent) are employed full time. Tables 3 and 4 establish that most of the long hours are not exceptional, but rather are worked on a usual basis, and that most of the extra hours are worked by full-time employees (though this is somewhat less true for females).

Table 3: The distribution of actual and usual hours of work, Ontario, 1985
Ontario paid workers (main job)

Hours per week	----Actual Hours Worked---- both sexes	males	females	----Usual Hours Worked----- both sexes	males	females
1-29	699.3	220.2	479.1	639.7	174.4	465.3
30-40	2174.1	1229.3	944.8	2734.2	1573.4	1160.9
41-44	178.9	124.6	54.3	116.0	87.7	28.3
45-48	236.7	178.3	58.4	164.9	125.2	39.7
49-59	252.6	201.6	51.0	204.0	161.0	43.0
60+	169.5	141.3	28.3	144.3	120.0	23.9
average hours	36.9	40.2	32.7	37.1	40.2	33.2
percentage over 40 hours	22.6	30.8	11.9	15.7	22.0	7.7
percentage over 48 hours	11.4	16.4	4.9	8.7	12.5	3.8
percentage over 60 hours	4.6	6.7	1.8	3.6	5.4	1.4

Source: Labour Force Survey special tabulations on the distribution of hours.

Table 4: The Distribution of Extra Hours, Ontario, 1985
Ontario paid workers (main job)

extra hours	employed ---extra hours worked--- all	males	females	employed full time ---extra hours worked--- all	males	females	employed part time ---extra hours worked-- all	males	females	full time working extra hours as a % of all working extra hours all	males	females
1-4	157.8	89.9	67.9	140.1	86.5	53.5	17.7	0	14.4	89%	96%	79%
5-9	194.7	129.4	65.3	175.9	125.8	50.1	18.8	0	15.2	90%	97%	77%
10-19	125.9	88.6	37.3	113.8	86.3	27.6	12.1	0	9.7	90%	97%	74%
20-29	28.7	20.6	8.1	25.2	19.8	5.4	0	0	0	88%	96%	67%
30-34	5.5	4.3	0	4.9	4	0	0	0	0	89%	93%	na
35+	5.5	4	0	4.9	0	0	0	0	0	89%	0%	na
average hours of those with extra hours	8.3	8.7	7.4	8.2	8.7	7.1	8.5	9.5	8.3			
average hours per person employed	1.07	1.31	0.76	1.12	1.36	0.74	0.75	0.62	0.81			

Source: Labour Force Survey special tabulations.

Table 5 provides some detail on long hours worked, arranged by industry and occupation. Columns 1, 2, and 3 report the percentage of work who work beyond 40 hours, 44 hours, and 48 hours per week, respectively. The next two columns report additional information on hours beyond 44 per week. Column 4 records information on the fraction of workers who work over 40 hours per week who, in fact, work in excess of 44. Column 5 records the same information but calculated for hours worked rather than numbers worked. That is, it reports on the fraction of long hours (defined here as over 40) that are hours over 44 per week. The last two columns provide parallel information on hours in excess of 48 per week. About half the long hours reported here are accounted for by workers working in excess 44, hours and only a slightly smaller fraction of long hours are worked in excess of 48.

Table 6 provides information on the comparability of data from the LFS and the Survey of Employment, Payrolls and Hours which is published in the monthly publication, Employment, Earnings and Hours. As we mentioned earlier, the major difference in coverage is that from SEPH data we are able to extract, information on paid workers only, and this is what is recorded in the table. Consequently, the numbers of workers on which the average hours of work are based in the case of paid workers is about half that shown by the LFS data.

Looking first at the average overtime hours per worker reported from the two sources, for the aggregate, it is quite remarkable that the figures are so close together — 1.1 hours per week in one case and 1.0 in the other. This, despite the fact that one refers to hourly paid employees, the other to all employees, and the fact that one refers to extra hours reported by employees (note the question quoted above) and the other to overtime hours reported by employers. Across the industries for which it is possible to make a comparison (reported Table 6), much more variation in overtime hours is apparent in the employer-reported data where the hours per worker range from 0.3 to 2.0, compared with 0.9 to 1.4 in the LFS data. The most substantial differences are found in the services sector both in overtime hours and in straight-time hours. The fact that the

Table 5: Workers with Long Hours, (actual hours) by sector, Ontario, 1985

Sector	percentage of workers over 40 hours	percentage of workers over 44 hours	percentage of workers over 48 hours	percentage of workers with long hours over 44 hours	percentage long hours over 44 hours	percentage of workers with long hours over 48 hours	percentage long hours over 48 hours
all employees	21	16	11	79	68	50	45
INDUSTRIES							
agriculture	39	39	30	100	78	78	57
other primary	0	0	0				
manufacturing	24	18	9	75	62	39	37
construction	30	25	18	84	71	59	47
trans & comm	24	19	13	80	70	53	47
trade	20	15	10	75	68	50	45
finance	20	16	12	82	71	59	48
service	12	9	5	75	71	38	52
public adm.	14	9	5	67	64	38	41
OCCUPATIONS							
managerial	27	23	16	84	71	58	48
clerical	9	5	2	61	57	28	32
sales	22	19	14	84	72	63	50
services	14	10	7	77	70	49	47
primary occups	29	29	22	100	76	74	55
processing	24	17	8	71	60	34	34
construction	25	19	13	78	68	51	44
transportation	37	32	23	85	73	62	51
mat & other crafts	16	11	5	66	52	29	24

Notes: The average of the 60+ class is assumed to be 65.

Source: Labour Force Survey special tabulations

Table 6: Comparison of hours of work data from the Labour Force Survey and the Survey of Employment, Payrolls and Hours, Ontario, 1985

Sector	----Labour Force Survey----- Usual Hours	Actual Hours	Extra Hours	Employment, Earnings and Hours Straight Time hrs.	Overtime hours	ratio of usual to standard hours	ratio of extra to overtime hours
Aggregate	37.1	36.9	1.1	32.1	1.0	1.16	1.07
Manufacturing	39.8	39.9	1.4	37.9	2.0	1.05	0.71
Construction	40.8	39.9	1.0	37.3	1.1	1.09	0.87
Transportation	39.4	39.4	1.0	37.4	1.6	1.05	0.63
Trade	34.6	34.5	0.9	27.9	0.5	1.24	1.79
Finance	38.1	37.7	0.9	26.3	0.5	1.45	1.75
Serv/Commercial	34.5	34.2	0.9	26.6	0.3	1.30	3.04

Source: Labour Force Survey data from special tabulatons, Employment, Earnings and Hours from 72-002, various issues, 1985.

straight-time hours relative to actual or usual hours differ most in these sectors as well, suggests a source of this difference in overtime and extra hours. In particular, it would appear that many more full-time workers are excluded the hourly paid category, leaving the hourly paid workers in these sectors made up of a larger fraction of part-time workers. It is precisely for part-time workers that we would expect a divergence between extra hours and overtime hours (as reported by employers). All in all, we are left with the view that the LFS data are helpful but should be treated with caution -- especially for some of the sectors.

Starting with Table 7, we begin to provide some calculations of the potential for job creation by reducing or eliminating long hours. In this table we use the LFS data on long actual hours to calculate the job equivalents of these long hours. By job equivalents, here and later in this paper, we will mean the number of jobs at average weekly hours, equivalent to the number of long hours being worked. Thus the job equivalents are not full time but rather, roughly the same mix of full-time and part-time jobs that are currently being worked.[28]

In Table 7, the first four columns report on the numbers working in each of the longer-hours classes by industry and occupation.[29] The next four columns report the job equivalents of these long hours (arrived at by taking the number of hours worked in these long-hour categories, and dividing by the average weekly hours. Thus, it is estimated that there are 264,000 average jobs' (jobs of average length) worth of hours in the hours worked beyond 40 hours per week in Ontario. Similarly, there are 23,000 jobs contained in the 60+ hours per week category. The last four columns of the table calculate the percentage these job equivalents make of total in Ontario (and the various sectors). Thus, in looking at the last column (first row), we note that if all hours in excess of 40 were converted to jobs of average length, there would be enough jobs to increase employment by 6.6 per cent.

The first thing one should recall in considering these numbers is that they are based on the Labour Force Survey data. These

Table 7: Workers with Long Actual Hours, and the Job Equivalents of those Long Hours, Ontario, 1985

Sector	Numbers of Workers with 41-44 hours	45-48 hours	49-59 hours	60+ hours	Job Equivalents of (in '000) hrs>60	hrs>48	hrs>44	hrs>40	Percentage of employment accounted for by job equivalents of hrs>60	hrs>48	hrs>44	hrs>40
all employees	178.9	236.7	252.6	169.5	23	119	181	264	0.6	3.0	4.5	6.6
INDUSTRIES												
agriculture	0	4.7	5.7	10.7	1	5	7	9	2.4	9.6	13.1	16.8
other primary	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
manufacturing	58.6	84.3	65.8	25.7	3	21	35	57	0.3	2.1	3.5	5.7
construction	9.1	14.4	20.6	13.2	2	9	13	18	0.9	4.6	6.8	9.6
trans & comm	14.1	18.2	20.3	16.3	2	10	15	21	0.7	3.5	5.2	7.4
trade	35.4	34.8	41.7	27.8	4	21	32	46	0.6	3.0	4.6	6.7
finance	8.5	11.4	16.8	11.7	2	8	12	17	0.6	3.3	4.9	6.8
service	35.8	53.4	68.8	55.1	8	27	38	53	0.7	2.3	3.2	4.4
public adm.	13.9	11.9	9.5	6.2	1	4	7	11	0.3	1.5	2.4	3.7
OCCUPATIONS												
managerial	50.8	82.7	109.9	77.1	10	50	75	105	0.8	4.2	6.3	8.8
clerical	25.4	20.8	13.1	5.1	1	5	9	15	0.1	0.7	1.2	2.1
sales	11.9	16.2	26.6	20.4	3	15	21	30	0.9	4.4	6.4	8.9
services	15.9	18.6	16.9	16.8	3	12	18	26	0.5	2.4	3.6	5.2
primary occups	0	6.5	7.6	11	1	6	8	10	1.6	6.7	9.2	12.1
processing	44.8	57.8	39.4	13.2	2	11	20	34	0.2	1.7	3.1	5.2
construction	9.9	11.9	14.5	7.8	1	6	8	13	0.6	3.1	4.8	7.1
transportation	7.9	11.7	16.5	15.2	2	9	12	17	1.3	6.2	9.0	12.4
mat & other cra	9.4	10.4	8	0	0	1	3	6	0.0	0.8	1.7	3.3

Notes: the average of the 60+ class is assumed to be 65.

Source: Special tabulations from the Labour Force Survey.

numbers do not correspond very closely to the numbers of workers who might be affected by legislation. We have already noted that somewhat less than one-half of these workers are likely to be affected by such legislation. These numbers are arrived at by simply calculating the job equivalents without asking about the policy tool that would actually convert long hours into new jobs. As we will see in the later tables, when mechanisms such as an increased overtime premium are put in place, they also increase the overall cost of labour and cause reductions in employment that offset any gains made by the substitution of overtime with new jobs.

A somewhat less exaggerated upper bound is provided in Table 8, where we look at extra hours rather than simply long hours. This eliminates multiple-job holders and also (at least on a per worker basis) seems roughly to correspond to the overtime hours from SEPH. Nevertheless, it still includes many workers not covered by the legislation.

These extra hours are equivalent to roughly 114,000 jobs. Included also in this table are the numbers unemployed in each of these industries and occupations and the ratios of those unemployed to the job equivalents. What this seems to show is that even if all extra hours could be translated to new jobs there would still not be enough new jobs to eliminate unemployment in Ontario. Moreover, by examining the last two columns of the table, it can be noted that the occupational and industrial distribution of unemployment is quite different than the distribution of extra hours. Some bottlenecks would likely show up in any attempt to translate these extra hours into new jobs, though to get a more realistic picture of where bottlenecks would show up, one would need information on job creation and unemployment that was broken down into more precise categories of occupation. Such information is not available for Ontario at present.

Table 9 reports the job-creation potential of eliminating overtime, based on the SEPH data for paid workers. Here, when we deal only with paid workers and calculate the job equivalents of overtime hours, we get a total of some 56,300 jobs -- about one-half

Table 8: The Match between Overtime Hours and the Unemployed

Sector	Job Equivalents of extra hours		Numbers Unemployed		Ratio of those unemployed to Job Equivalents	
	males	females	males	females	males	females
all employees	72890	41028	186000	154000	2.6	3.8
INDUSTRIES						
agriculture	868	0	7000	6000	8.1	na
other primary	1518	0	5000	0	3.3	na
manufacturing	28583	5981	47000	32000	1.6	5.4
construction	4461	0	35000	0	7.8	na
trans & comm	7118	1921	12000	5000	1.7	2.6
trade	9455	8595	27000	26000	2.9	3.0
finance	2528	3037	4000	9000	1.6	3.0
service	13383	18236	39000	65000	2.9	3.6
public adm.	4996	2440	10000	8000	2.0	3.3
OCCUPATIONS						
managerial	23285	15196	22000	30000	0.9	2.0
clerical	4615	11376	11000	46000	2.4	4.0
sales	4179	4849	12000	13000	2.9	2.7
services	6056	4713	26000	31000	4.3	6.6
primary occups	1643	0	15000	5000	9.1	na
processing	19250	2667	41000	21000	2.1	7.9
construction	5059	na	33000	0	6.5	na
transportation	3967	0	13000	0	3.3	na
mat & other crafts	4830	902	13000	7000	2.7	7.8

Source: Calculations based on unpublished tabulations on extra hours from the Labour Force Survey.

Table 9: Job creation potential of complete elimination of overtime, Hourly paid employees, 1985.

Industry	Number of hourly paid employees	Average overtime hours	Average hours	Average straight time hours	New jobs with zero overtime	Percent employment increase
Forestry	5.2	2.2	40.6	38.4	304.0	5.8
Mines	18.9	1.8	40.4	38.6	883.9	4.7
Manufacturing	566.1	2.0	39.9	37.9	29379.8	5.2
Mfg - durable	317.7	1.9	41.1	39.2	15484.8	4.9
Mfg - non-durable	247.9	2.0	38.3	36.3	13774.1	5.6
Construction	112.5	1.1	38.4	37.3	3214.5	2.9
Goods Prod Industries	703.6	1.8	39.6	37.8	33630.6	4.8
Transp & Commun	92.5	1.6	38.9	37.4	3942.2	4.3
Trade	378.4	0.5	28.4	27.9	6547.1	1.7
Finance	29.6	0.5	26.8	26.3	581.3	2.0
Commercial	515.9	0.3	27.0	26.6	6456.7	1.3
Services	1031.3	0.5	28.6	28.1	18945.4	1.8
Industrial Aggregate	1733.9	1.0	33.1	32.1	56308.5	3.2

Source: Employment, Earnings and Hours, (Statistics Canada 72-002), monthly issues, 1985.

the number calculated from the extra hours data. The distribution across industries is shown as is the per cent employment increase that would arise in each industry if all these jobs were created. Here, it is important to note that the employment increase is for paid workers only. The increase as a percentage of all workers would be much lower -- closer to one-half of this figure. It is the figures in these tables that we believe provide a more reasonable upper bound for the calculation of potential job-creation effects of eliminating overtime.[30]

Table 10 provides our estimates of the likely effects of going to a double-time overtime premium after standard hours of work (that is, for overtime hours). As mentioned earlier in this report, the calculations we have done here are based on the methodology and elasticity estimates of Ehrenberg and Schumann (1982). Our reading and analysis suggest that these are the best estimates since they use the most recent data,[31] and, as opposed to Nussbaum and Wise (1978), Ehrenberg and Schumann did considerable experimentation at the econometric stage to indicate the stability and robustness of their parameters. Finally, as opposed to Laudadio and Percy (1973), the only Canadian Study to provide any estimate, they used firm level data rather than aggregate industry data and were able to control for a number of other factors that influence overtime.[32]

Ehrenberg and Schumann start by estimating the elasticity of overtime hours with respect to the ratio of fixed per worker costs to variable labour costs (the overtime wage rate). These, they estimated from an equation like the following:

$$\log OT = A + B \log (F/W) + C'*X$$

where, OT is annual overtime per worker, F/W is the ratio of fixed to variable costs, X is a vector of control variables, and A,B, and (the vector) C' are parameters to be estimated. X does not include any scale variables (output, or total workers). This is consistent with the production framework sketched out in the second section of this report, as long as the labour-services function is homothetic in workers and hours.[33] The elasticity mentioned above is given by the parameter B. The values we have chosen for B (reported in the

Table 10: Job Creation Estimates of going to double time after standard hours based on overtime hours of paid workers reported by establishments

INDUSTRY	elasticity assumed for OT with respect to relative price	decrease in OT hours per week with double time after std. hrs.	number of equivalent jobs at average standard hours	equivalent jobs as a percent of initial employment	offset in jobs due to increased average cost of labour	net job increase as a percent of initial employment
Forestry	0.5	1667 hrs	43.4	0.8	30.5	0.2
Mines	0.5	4872 hrs	126.3	0.7	89.8	0.2
Manufacturing	0.5	159035 hrs	4197.1	0.7	2970.2	0.2
Mfg - durable	0.5	86604 hrs	2212.1	0.7	1666.9	0.2
Mfg - non-durable	0.5	71428 hrs	1967.7	0.8	1301.0	0.3
Construction	0.5	17140 hrs	459.2	0.4	333.4	0.1
Goods Prod Industries		182715 hrs	4826.0	0.7	3424.0	0.2
Transp & Commun	0.755	31762 hrs	850.4	0.9	323.8	0.6
Trade	0.755	39450 hrs	1412.3	0.4	549.8	0.2
Finance	0.755	3299 hrs	125.4	0.4	48.7	0.3
Commercial	0.755	37095 hrs	1392.8	0.3	544.5	0.2
Services	0.755	111606 hrs	3780.9	0.4	1466.8	0.2
industrial Aggregate	na	294321 hrs	8606.9	0.5	4890.8	0.2

Sources: Employment, overtime, and average hours of work, from Employment, Earnings and Hours, data for hourly paid workers. Elasticities are from Ehrenberg and Schumann, 1982.

first column of the table) are in the middle of the range of those estimated by Ehrenberg and Schumann (see their Tables 2.3 and 2.4).[34]

The second step in the calculations is to estimate the increase in the marginal wage resulting from an increase to double time after standard hours. In order to do this, one needs an estimate of the current wage paid (on average) for overtime hours, or the average overtime premium. There is very little data to go on in this regard. The best source seems to be the survey from which the overtime hours are calculated (SEPH), which records straight-time hours, overtime hours, total straight-time pay, and total overtime pay. From this information, one can calculate an average straight-time wage and an average overtime wage and use the ratio to estimate the average premium. Calculations for 1985 from this data base indicate a figure of around 1.6. In addition, calculations from a data base on union contracts indicate that time-and-one-half after straight-time hours, which are typically around 40, is by far the most common provision,[35] with double time and occasionally higher premiums for weekends. In light of this information, and to bias any effects we might find on the high side, we take 1.5 to be the initial overtime rate and assume it takes effect after the straight-time hours (that is, for the overtime hours) reported in Table 9.

The percentage change in the ratio from 1.5 to 2.0 is then taken to be 2/7 or 28.6 per cent,[36] and this percentage increase multiplied by the elasticities in the first column of Table 10 yields the percentage decreases in overtime. Multiplying by the initial amount of overtime yields column 2, the decrease in weekly overtime hours.[37] Column 3 of the table gives the number of jobs that would be created (the number of equivalent jobs) if all this overtime were converted to new jobs (at average weekly hours). Column 4 expresses these new jobs as a per cent of the initial employment of <u>paid</u> workers (they would be about half as large as this as a percentage of all workers). These two columns are best thought of as the maximum effects of such a job-creation exercise. These effects would materialize only if all the hours were replaced by new employees working, on average, the average standard hours.

There are a number of reasons why one might expect smaller employment effects than these. The most obvious of these, and we think one of the most important, is that wage costs would now be higher than they were previously. This should give rise to two effects: other inputs would be substituted for the more expensive overtime labour,[38] and the overall scale of operations may be reduced because of the higher costs. Both of these would work to reduce the number of such jobs created. To get an estimate of these effects, we follow the approach taken by Ehrenberg and Schumann.[39] The basic idea is to draw on the estimates of labour demand from the general factor-demand literature. One can estimate the average wage cost increase that arises as a consequence of the proposed change in the overtime premium.[40] This can then be used in conjunction with the elasticity of labour demand to estimate the job reductions that one might expect as a consequence of this average increase.[41] We take 0.3 as the estimate of the labour demand elasticity, as did Ehrenberg and Schumann.[42] This is the estimate that seems to emerge from the surveys of this literature by Hamermesh (1976 and 1987a).[43]

The second last column of Table 10 reports the estimated reduction in employment owing to the increased price of labour. The last column reports on the net effect of the increase owing to reduced overtime hours, combined with the decrease owing to the increased average cost of labour expressed as a percentage increase of paid workers.[44] The estimated offsets here are quite substantial, relative to the initial change, and suggest that the use of increases in the overtime premium as a way of creating jobs is unlikely to be anywhere near as successful as would appear from column 4 of the table.

Table 11 makes a more favourable assumption about the response of overtime to the change in the fixed-cost wage ratio. It assumes that the elasticity of demand for all industries is unity. This allows for close to the maximum response of overtime to the relative price change.[45] It is at the upper end of the range of the Ehrenberg and Schumann estimates. This assumption gives a much more favourable response in the overtime reduction, and the offsets created by the increased cost of labour are much smaller as well.[46]

Table 11: Job creation estimates of going to double time after standard hours based on overtime hours of paid workers reported by establishments. High Elasticity Assumption.

INDUSTRY	Elasticity assumed for OT with repect to relative price	Decrease in OT hours per week with double time after std. hrs.	Number of equivalent jobs at average standard hours	Equivalent jobs as a percent of initial employment	Offset in jobs due to increased average cost of labour	Net job increase as a percent of initial employment
Forestry	1	3334 hrs	86.9	1.7	18.9	1.3
Mines	1	9743 hrs	252.5	1.3	55.4	1.0
Manufacturing	1	318071 hrs	8394.2	1.5	1835.8	1.2
Mfg - durable	1	173209 hrs	4424.2	1.4	1030.3	1.1
Mfg - non-durable	1	142857 hrs	3935.4	1.6	804.1	1.3
Construction	1	34281 hrs	918.4	0.8	203.4	0.6
Goods Prod Industries		365429 hrs	9652.0	1.4	2113.5	1.1
Transp & Commun	1	42069 hrs	1126.4	1.2	247.6	0.9
Trade	1	52252 hrs	1870.6	0.5	416.9	0.4
Finance	1	4370 hrs	166.1	0.6	37.0	0.4
Commercial	1	49133 hrs	1844.8	0.4	412.2	0.3
Services	1	147823 hrs	5007.8	0.5	1113.7	0.4
Industrial Aggregate	1	513252 hrs	14659.9	0.8	3227.3	0.7

Sources: Employment, overtime, and average hours of work, from Employmet, Earnings and Hours, data for hourly paid workers, 1985.

Nevertheless, even this effect (0.7 per cent in the aggregate) would amount to only about 0.3 to 0.4 of a percentage point improvement in the unemployment rate when one takes account of the fact that these calculations are based on paid workers, not on the labour force.

Moreover, there are a number of other considerations that mean that the effects on unemployment are likely to be even smaller. Some of the workers denied overtime may instead moonlight, replacing the lost hours with part-time jobs. In addition, there may be some positions created for which there are no workers with the appropriate skills.

As for the moonlighting issue, one could get some view of this by learning whether the overtime that is being worked is desired by the employees or is thrust on them by employers. If, for the most part, workers want, and indeed seek out, these long hours, then one would expect that they will try to replace them with some alternative if the long hours are denied. In fact, if one believes that the labour market allocates workers at all effectively, then it is likely that the workers who want the overtime hours will be found in the sectors that offer the overtime hours.[47] If so, although a part-time moonlighting job may not be anywhere near as financially attractive, some will chose this route and prevent the jobs from going to the unemployed.[48] To the extent that one ends up with a situation where many of the same people are working the long hours, though for different employers, and presumably at lower productivity (as evidenced by the lower wages), this policy can hardly be considered a success.

The second issue that might reduce the transference of the reduced overtime into additional jobs is the ability to find replacement workers. Table 8, in fact, reported on the occupational distribution of the unemployed and compared it to where jobs might be created (job equivalents of extra hours). Few problems are seen at this broad level of aggregation, though it has been argued that the problem is much more severe at the narrower occupational classes. While this is undoubtedly true, it is also true that there are vast possibilities for substitution available by moving existing workers

up the job ladders and replacing these workers with less skilled workers at the lowest levels. Such possibilities are entirely overlooked by a comparison of the occupational distributions of job creation and unemployment. To do a serious analysis of these possibilities would require a skills analysis not only of the unemployed and the jobs that would be created, but also of the existing workplace. Because of the wide range of substitution possibilities in the labour market, it is our view that one should not make much of a further reduction (on this account) to the numbers in the last columns of Tables 10 and 11.

Finally, on this theme, we should say a word about legislative compliance. As far as one can tell, the existing legislation with its requirement of time-and-one-half pay after 44 hours is, for most employers, not a binding constraint,[49] and so one cannot look at compliance with this legislation as a guide to the likely problems of compliance under the proposed legislation. Double time after standard hours (roughly 40) would clearly be a major imposition on many employers, and one should expect some noncompliance. If one is to turn to the compliance we currently see with the 100-hour permits and the special permits as a guide, one should expect significant compliance problems. To be sure, the noncompliance that we have suggested exists regarding special permits is not likely to be monitored and reported by individual employees -- indeed, many of them probably want the overtime and do not want to lose it. Since the enforcement of the restrictions on overtime is complaints-based, it is not surprising that few complaints are received.[50] On the other hand, one can expect complaints from workers who would like to receive double-time pay and are receiving less. Again, however, if it is in the mutual interest of the workers and the employers to work the overtime at a lower rate of pay, then neither side will have an incentive to report abuse.[51]

Turning once again to the tables, we report in Tables 12 and 13 an attempt to estimate the job-creation impacts of a double-time policy that takes effect either at 44 hours (Table 12) or at 48 hours (Table 13). We note at the outset that these calculations are on even more tenuous grounds than the previous ones. The reasons for

Table 12: Job creation estimates of going to double time after 44 hours based on overtime hours of paid workers reported by establishments

INDUSTRY	Elasticity assumed for OT with respect to relative price	Decrease in OT hours per week with double time after 44 hours	Number of equivalent jobs at average standard hours	Equivalent jobs as a percent of initial employment	Offset in jobs due to increased average cost of labour	Net job increase as a percent of initial employment
Forestry	0.5	1134 hrs	29.5	0.6	20.7	0.2
Mines	0.5	3313 hrs	85.9	0.5	61.0	0.1
Manufacturing	0.5	98602 hrs	2602.2	0.5	1836.6	0.1
Mfg - durable	0.5	53695 hrs	1371.5	0.4	1030.7	0.1
Mfg - non-durable	0.5	44286 hrs	1220.0	0.5	804.4	0.2
Construction	0.5	12170 hrs	326.0	0.3	236.5	0.1
Goods Prod Industries		115218 hrs	3043.6	0.4	2154.7	0.1
Transp & Commun	0.755	22234 hrs	595.3	0.6	226.0	0.4
Trade	0.755	26826 hrs	960.4	0.3	373.4	0.2
Finance	0.755	2342 hrs	89.0	0.3	34.5	0.2
Commercial	0.755	26337 hrs	988.9	0.2	386.3	0.1
Services	0.755	77739 hrs	2633.6	0.3	1020.3	0.2
Industrial Aggregate	na	192957 hrs	5677.2	0.3	3175.0	0.1

Sources: Employment, overtime, and average hours of work, from Employment, Earnings and Hours, data for hourly paid workers, 1985. Elasticities are from Ehrenberg and Schumann, 1982. Proportions of extra hours greater than 44 are from the Labour Force Survey, special tabulations.

Table 13: Job Creation Estimates of going to double time after 48 hours based on overtime hours of paid workers reported by establishments

INDUSTRY	Elasticity assumed for OT with repect to relative price	Decrease in OT hours per week with double time after 48 hours	Number of equivalent jobs at average standard hours	Equivalent jobs as a percent of initial employment	Offset in jobs due to increased average cost of labour*	Net job increase as a percent of initial employment
Forestry	0.5	750 hrs	19.5	0.4	13.7	0.1
Mines	0.5	2192 hrs	56.8	0.3	40.3	0.1
Manufacturing	0.5	58843 hrs	1552.9	0.3	1094.1	0.1
Mfg - durable	0.5	32044 hrs	818.5	0.3	614.0	0.1
Mfg - non-durable	0.5	26429 hrs	728.1	0.3	479.2	0.1
Construction	0.5	8056 hrs	215.8	0.2	156.4	0.1
Goods Prod Industries		69842 hrs	1845.1	0.3	1304.4	0.1
Transp & Commun	0.755	14928 hrs	399.7	0.4	151.5	0.3
Trade	0.755	17753 hrs	635.5	0.2	246.9	0.1
Finance	0.755	1584 hrs	60.2	0.2	23.3	0.1
Commercial	0.755	19289 hrs	724.3	0.1	282.8	0.1
Services	0.755	53554 hrs	1819.7	0.2	704.5	0.1
industrial Aggregate	na	123395 hrs	3664.8	0.2	2008.9	0.1

Sources: Employment, overtime, and average hours of work, from Employnet, Earnings and Hours, data for hourly paid workers, 1985. Elasticities are from Ehrenberg and Schumann. Proportions of extra hours greater than 44 are from the Labour Force Survey, special tabulations.

this are, first, that a double-time premium after 44 or 48 hours involves a somewhat more complex wage schedule than we have currently -- at least for the majority of firms. There would typically be a three-piece schedule rather than a two-piece one. Second, it is not clear from the data how many overtime hours would be affected by such a policy (more on this below). Third, to apply the elasticities from the Ehrenberg type overtime equations is to apply them in a different context than the one in which they were originally estimated. Fourth, the degree to which employers would respond to such legislation by adjusting their own wage schedules is not clear. We have assumed in our calculations that employers would continue with the pay arrangements they currently have for hours between the standard workweek and the point at which double time commences. However, it would not be surprising for employers who currently pay time-and-one-half after, say, 40 hours, to revert to straight-time between 40 and, say, 44 hours if they are not precluded from doing so by legislation. Employers under these circumstances working their employees 48 hours would pay them exactly the same under the new scheme as under the old scheme, and any effects of the legislation would be dampened.

As mentioned in the second point above, it is not obvious how many overtime hours would be affected by such a policy. Recall from the earlier discussion that we have been using the overtime hours data from the Survey of Employment, Payrolls and Hours, which is collected from employers' records. From this source we know the total overtime hours of hourly paid workers by industry. However, from this source, there is no information on the distribution of these overtime hours. Moreover, though we know the average of standard hours, we are not really very certain when the overtime rates take effect by industry.[52] The only available source on the distribution of long hours is the Labour Force Survey, and we have used this source to generate an estimate of the fraction of overtime hours for which the double-time premium would apply (either at 44 or 48 hours). The estimates we use for this purpose are the fractions of long hours (over 40 hours) which exceed either 44 hours or 48 hours. These were reported in Table 5, columns 5 and 7. Thus our procedure is to assume that similar fractions of overtime hours (from

SEPH) would be affected by the legislation. We take these fractions of the overtime hours, apply the elasticities in column 1 of Tables 12 and 13 and the assumed increase in the fixed-cost (as before, 28.6 per cent) to arrive at column two, the estimate of the decrease in overtime hours that would ensue. The figures here are then translated into job equivalents as before.[53] The implied increase in the average wage cost is then calculated, and, as before, the offsetting job reduction is calculated assuming an elasticity of demand of 0.3. As can be seen by examination of these tables, the net job increases are somewhat lower than in the case where all overtime is paid at the double-time rate. Bearing in mind all the caveats, our estimate is that double time after 44 hours yields about 2/3 of the effect, while double time after 48 hours appears to yield just under 1/2 of the effect.[54]

The next three tables report on a somewhat different sort of exercise. In particular, we investigate the prospects for affecting overtime and employment by decreasing fixed-costs for marginal workers[55] rather than by increasing the wage. Here, for the first time, we need data on actual wage levels and on fixed-costs to make any meaningful calculations.[56] To find reasonable estimates for this exercise, we took data from Thorne, Stevenson and Kellogg (1984, for the total wage bill and for fringe benefits. While fringe benefits correspond only loosely to the notion of fixed-costs, there is a great deal of overlap in these measures.[57] We use these data for 1984, the latest year for which data are available, to calculate an increase in fixed-costs that creates roughly the same effect on unit wage costs (and hence on the total wage bill) as the proposed increase to double time for all overtime hours. This approximate calculation involved estimating a straight-time wage from the Thorne data. Supposing the overtime wage increased from time-and-one-half to double time, we calculated, by industry, the effect that this would have on the wage bill if there were no change in overtime. This came out to be between $400 and $500 per worker for the year 1984 (though it would be somewhat less if allowance were made for the reduction in overtime). We then supposed that instead of increasing the overtime premium, the policy initiative was a marginal employment subsidy of roughly this magnitude.[58] The implied changes in the wage

to fixed-cost ratio and in the average wage[59] could then be calculated as could responses to these of the sort calculated in the earlier tables. In Tables, 14, 15, and 16, we show such calculations for $400, $300, and $500, respectively.

Before turning to the tables, we want to provide some rationale for these calculations. One of the problems we have identified with increasing the overtime premium is that by doing so, average labour costs are increased and this in turn results in an offsetting reduction in jobs. Since the increased overtime premium has its direct effect by increasing the wage rate relative to fixed-costs, it seems natural to consider policies that would have the same effect on the relative wage but that would have positive rather than negative employment effects owing to changes in average wage costs. Such a scheme is a subsidy to fixed-costs (or, a reduction in the payroll taxes[60] for CPP, workers' compensation, etc.). It increases the wage to fixed-cost ratio by reducing the denominator of the expression and consequently reducing unit labour costs.

The effects reported in Tables 14, 15, and 16 seem to us to be quite encouraging. Fairly modest per (new) worker subsidies lead to more substantial job creation than do the overtime premium increases. The effects of the most modest $300 subsidy appear more substantial than an increase in the overtime premium to double time for all overtime hours (reported in Table 10). We want to emphasize here that these calculations are very rough, and ignore the well-known administrative difficulties associated with marginal employment subsidies, and we do not place a lot of weight on the exact numbers. Rather, we think that the tables suggest that when job creation is the goal, such subsidies look to be at least as effective as increased overtime premiums. To phrase it differently, if one's interest is simply in creating jobs and there is no desire to reduce overtime per se, there appear to be other policies more attractive than trying to get firms to substitute overtime for jobs.

Table 14: Job creation estimates of an employment subsidy of $400 (1984 dollars).

INDUSTRY	Elasticity assumed for OT with respect to relative price	Decrease in OT hours per week	Number of equivalent jobs at average standard hours	Equivalent jobs as a percent of initial employment	Addition to jobs due to reduced average cost of labour††	Net job increase as a percent of initial employment
Forestry‡	0.5	179 hrs	4.7	0.1	32.9	0.7
Mines	0.5	548 hrs	14.2	0.1	92.0	0.6
Manufacturing	0.5	24128 hrs	636.8	0.1	3775.6	0.8
Mfg - durable	0.5	13139 hrs	335.6	0.1	2118.9	0.8
Mfg - non-durable	0.5	10837 hrs	298.5	0.1	1653.7	0.8
Construction	0.5	3106 hrs	83.2	0.1	690.7	0.7
Goods Prod Industries		27961 hrs	738.8	0.1	4591.1	0.8
Transp & Commun	0.755	4706 hrs	126.0	0.1	562.0	0.7
Trade	0.755	9527 hrs	341.1	0.1	3368.8	1.0
Finance	0.755	605 hrs	23.0	0.1	185.5	0.7
Commercial	0.755	6672 hrs	250.5	0.0	3234.4	0.7
Services	0.755	21509 hrs	740.5	0.1	7350.8	0.8
Industrial Aggregate	na	49470 hrs	1479.4	0.1	11941.9	0.8

‡ Thorne, Stevenson and Kellog (1984) data on pulp and paper is used for the forestry sector in these calculations as no separate forestry sector is available in that data.

Sources: Employment, overtime, and average hours of work, from Employnet, Earnings and Hours, data for hourly paid workers, 1985. Fringe benefit costs as a fraction of wages, are from Thorne, Stevenson and Kellogg, 1984. Elasticities are from Ehrenberg and Schumann, 1982.

Table 15: Job creation estimates of an employment subsidy of $300 (1984 dollars).

INDUSTRY	Elasticity assumed for OT with respect to relative price	Decrease in OT hours per week	Number of equivalent jobs at average standard hours	Equivalent jobs as a percent of initial employment	Addition to jobs due to reduced average cost of labour††	Net job increase as a percent of initial employment
Forestry‡	0.5	135 hrs	3.5	0.07	24.7	0.5
Mines	0.5	411 hrs	10.6	0.06	69.0	0.4
Manufacturing	0.5	18096 hrs	477.6	0.08	2831.7	0.6
Mfg - durable	0.5	9854 hrs	251.7	0.08	1589.1	0.6
Mfg - non-durable	0.5	8127 hrs	223.9	0.09	1240.3	0.6
Construction	0.5	2330 hrs	62.4	0.06	518.0	0.5
Goods Prod Industries		20971 hrs	554.1	0.08	3443.3	0.6
Transp & Commun	0.755	3529 hrs	94.5	0.10	421.5	0.6
Trade	0.755	7146 hrs	255.8	0.07	2526.6	0.7
Finance	0.755	454 hrs	17.2	0.06	139.1	0.5
Commercial	0.755	5004 hrs	187.9	0.04	2425.8	0.5
Services	0.755	16132 hrs	555.4	0.05	5513.1	0.6
industrial Aggregate	na	37103 hrs	1109.5	0.1	8956.4	0.6

‡ Thorne, Stevenson and Kellog (1984) data on pulp and paper is used for the forestry sector in these calculations as no separate forestry sector is available in that data.

Sources: Employment, overtime, and average hours of work, from Employnet. Earnings and Hours, data for hourly paid workers, 1985. Fringe benefit costs as a fraction of wages, are from Thorne, Stevenson and Kellogg, 1984. Elasticities are from Ehrenberg and Schwaann, 1982.

Table 16: Job Creation Estimates of an employment subsidy of $500 (1984 dollars).

INDUSTRY	Elasticity assumed for OT with respect to relative price	Decrease in OT hours per week	Number of equivalent jobs at average standard hours	Equivalent jobs as a percent of initial employment	Addition to jobs due to reduced average cost of labour††	Net job increase as a percent of initial employment
Forestry‡	0.5	224 hrs	5.8	0.11	41.1	0.9
Mines	0.5	685 hrs	17.7	0.09	114.9	0.7
Manufacturing	0.5	30160 hrs	795.9	0.14	4719.4	1.0
Mfg - durable	0.5	16424 hrs	419.5	0.13	2648.6	1.0
Mfg - non-durable	0.5	13546 hrs	373.2	0.15	2067.1	1.0
Construction	0.5	3883 hrs	104.0	0.09	863.3	0.9
Goods Prod Industries		34951 hrs	923.6	0.13	5738.9	0.9
Transp & Commun	0.755	5882 hrs	157.5	0.17	702.5	0.9
Trade	0.755	11909 hrs	426.3	0.11	4211.0	1.2
Finance	0.755	756 hrs	28.7	0.10	231.9	0.9
Commercial	0.755	8340 hrs	313.1	0.06	4043.0	0.8
Services	0.755	26887 hrs	925.7	0.09	9188.4	1.0
Industrial Aggregate	na	61838 hrs	1849.2	0.1	14927.3	1.0

‡ Thorne, Stevenson and Kellog (1984) data on pulp and paper is used for the forestry sector in these calculations as no separate forestry sector is available in that data.

Sources: Employment, overtime, and average hours of work, from Employnet, Earnings and Hours, data for hourly paid workers, 1985. Fringe benefit costs as a fraction of wages, are from Thorne, Stevenson and Kellog, 1984. Elasticities are from Ehrenberg and Schumann, 1982.

Attention to these tables will reveal that a much smaller fraction of the response to a decrease in fixed-costs comes about as a consequence of relative price effects than in the earlier tables. This should not be surprising, since the change in fixed-costs (and hence in the wage to fixed-cost ratio) is on the order of 3 per cent rather than the close to 30 per cent change engendered by the increased overtime premium. Most of the effect in these calculations comes from moving down the demand curve for labour, while much more of the effect in the earlier calculations came from substituting long hours for jobs.

SUMMARY AND CONCLUSIONS

In this paper, we have attempted to analyze two labour market policies -- reductions in overtime and reductions in the standard workweek -- in terms of their impact on employment creation. In both cases, the existing literature has been reviewed, and in the case of reduced overtime, estimates of the potential employment increases for Ontario have been made.

With respect to the reduced workweek, we argue that considerable caution needs to be exercised before implementing such a policy for purposes of employment creation. We note that there is considerable variation in standard hours among Ontario firms, and the impact of any restriction would be quite different for different firms. Presumably, such variations also allow Ontario workers to choose their standard hours by choosing the firm or industry. To restrict this variation restricts workers' choices and imposes costs on employers.

On the empirical side, the available literature suggests that the employment effects of reducing standard hours are likely to be small, and may even be negative, particularly in firms which have the option of substituting overtime or other factors of production. It could be argued, of course, that one way to enhance the employment effects of reducing the standard workweek would be to simultaneously prohibit (or discourage) the use of overtime. It should be noted, however, that such a plan would undoubtedly increase labour costs,

resulting in a negative scale effect on employment. Hence, the net employment effect in this case might be positive, zero, or negative.

One positive note from the reduced-workweek literature is the result that some firms which currently do not use overtime can be expected to increase their employment levels in response to a reduction in standard hours. In view of this, the relevant question becomes whether or not employment in the aggregate would increase if the policy were applied to all firms. Without the necessary data[61] and the appropriate empirical analysis of this issue, however, the answer to this question is impossible to predict.

Finally, we recognize, of course, that a reduced standard workweek might be desirable for other reasons -- an increased demand for leisure, for example -- and we see no reason why workers (or their unions) should not (and would not) negotiate such a policy where appropriate. The main point is simply that positive employment effects are not a certain result from reducing standard hours, and the policy should not be implemented solely for that purpose.

As for the overtime problem, the available evidence does suggest that there has been some increased usage of overtime hours in Ontario over the last ten years. Data from the Labour Force Survey, for example, show that extra hours per worker (averaged over workers who worked extra hours) have grown about 4 per cent to the 1985 level of 8.3 hours. Extra hours per worker (averaged over all workers), on the other hand, have grown by 16 per cent from 0.92 to 1.07 hours, indicating a sizable increase in the fraction of workers who work overtime. These trends are supported, moreover, by both the growth in demand for 100-hour permits and the maximum hours approved in the special permits issued by the Ontario Ministry of Labour.

With respect to estimating the employment effect of reducing overtime hours, the paper considered various ways of implementing such a policy: (1) outright restrictions on all overtime, (2) an increase in the overtime premium after (a) 40 hours,[62] (b) 44 hours, and (c) 48 hours; (3) introducing marginal employment subsidies.

Calculating the employment effects of an outright ban on all overtime was done using data from both the Labour Force Survey (LFS) and the Survey of Employment, Payrolls and Hours (SEPH). Because the SEPH data are thought to reflect more accurately the actual overtime hours worked, however, and because the coverage in that data set corresponds more closely to the individuals actually covered by the Employment Standards legislation, the employment estimates from the SEPH data are thought to provide the more reasonable upper bound of the potential employment-creation effects. In this case, Table 9 shows that if all overtime were eliminated in Ontario, 56,300 jobs could be created, representing an employment increase of 3.2 per cent of paid employees, or an increase in overall employment of approximately half this size (1.6 per cent). We note, however, that this is a maximum estimate which takes no account of possible noncompliance with the policy or of reductions in the workforce that might arise because the policy designed, to reduce overtime, makes labour more costly for employers. If noncompliance were widespread, which it very well might be, much smaller employment effects would be observed; and if the policy chosen makes the use of labour much more costly for the firm, any gains in employment may be substantially offset.

Implementing reductions in overtime by increasing the overtime wage premium from time-and-one-half to double time gives a clearer picture of the kind of job-creation opportunities that may be available. In Table 10, we see that increasing the overtime premium to double time after standard hours produces a maximum potential employment increase (in terms of paid employees) of 0.5 per cent. Accounting for the offset owing to increased labour costs reduces this to about a 0.2 per cent increase in employment for paid employees (for the industrial aggregate), or about a 0.1 per cent increase in employment for all employees.

If we use a higher elasticity assumption (about the responsiveness of overtime hours to the wage to fixed-cost ratio) in the double-time scenario, on the other hand, the calculations in Table 11 show a more favourable response of overtime to changes in

the relative prices. In this case, the potential employment impact (for the industrial aggregate) is 0.7 per cent for paid employees (0.3 to 0.4 per cent for all workers), even after adjusting for increases in unit labour costs. Clearly, such job-creation calculations are sensitive to the elasticity assumption, and that is unfortunate because there is no Ontario evidence, in fact no reliable Canadian evidence.[63] on this parameter. Given the evidence to date, we believe that the Table 10 estimates are the most appropriate but we cannot be highly confident about their accuracy. For the optimist, who believes substitution of overtime hours is really quite easy for employers and a substantially higher elasticity is appropriate, we provide one more set of calculations in Table 17, which responsiveness used in Table 10). Here, the net job effect on hourly paid workers rises to about 1.2 per cent, or about 0.6 per cent for the workforce as a whole. This is certainly a more substantial increase than those reported earlier and underlines the importance for policy analysis of getting better estimates of this elasticity.[64]

Calculating the employment effects of increasing the overtime premium from time-and-one-half to double time after 44 or 48 hours is a more difficult exercise because the SEPH data do not provide information on the distribution of overtime hours. Using the assumption that the distribution of overtime hours is the same as the distribution of extra hours provided in the Labour Force Survey, however, we find that the maximum potential employment effects of going to double time after 44 or after 48 hours are approximately two-thirds and one-half the employment increases (respectively) of going to double time after standard hours.

As a final calculation, not reported earlier, we add Table 18, which considers the possibility of going to triple time after standard hours. While we do not consider this a likely policy option, we nevertheless expect that some will be interested in what happens if one increases the overtime premium even further. The net job increase goes to 0.5 per cent of paid workers from the 0.2 per cent reported earlier in Table 10. One can clearly have greater effects if one goes to these extremes. However, in considering

Table 17: Job Creation Estimates of going to double time after standard hours based on overtime hours of paid workers reported by establishments

INDUSTRY	Elasticity assumed for OT with repect to relative price	Decrease in OT hours per week	Number of equivalent jobs at average standard hours	Equivalent jobs as a percent of initial employment	Addition to jobs due to reduced average cost of labour††	Net job increase as a percent of initial employment
Forestry	1.5	5001 hrs	130.3	2.5	7.1	2.4
Mines	1.5	14615 hrs	378.8	2.0	20.5	1.9
Manufacturing	1.5	477106 hrs	12591.3	2.2	685.0	2.1
Mfg - durable	1.5	259813 hrs	6636.3	2.1	384.4	2.0
Mfg - non-durable	1.5	214285 hrs	5903.2	2.4	300.0	2.3
Construction	1.5	51421 hrs	1377.7	1.2	72.4	1.2
Goods Prod Industries		548144 hrs	14478.1	2.1	785.1	1.9
Transp & Commun	1.5	63104 hrs	1689.5	1.8	90.7	1.7
Trade	1.5	78378 hrs	2805.9	0.7	144.8	0.7
Finance	1.5	6554 hrs	249.1	0.8	12.9	0.8
Commercial	1.5	73699 hrs	2767.2	0.5	141.6	0.5
Services	1.5	221735 hrs	7511.7	0.7	390.0	0.7
industrial Aggregate	na	769878 hrs	21989.8	1.3	1175.1	1.2

Sources: Employment, overtime, and average hours of work, from Employment, Earnings and Hours, data for hourly paid workers. Fringe Benefit costs as a fraction of wages, are from Thorne, Stevenson and Kellog, 1984. Elasticities are from Ehrenberg and Schumann.

raising the premium more and more, we should keep in mind that such a policy puts those who simply cannot avoid overtime at a severe disadvantage relative to those who are able to substitute away from overtime.

We note, finally, that all of the employment estimates from increasing the overtime wage premium are still somewhat exaggerated, since they are not corrected for the possibility that (a) some workers who currently work overtime may now moonlight or look for part-time work to make up the lost (overtime) income, and (b) there will be some skill bottlenecks. In view of the fact that there may be good opportunities for skill substitution within firms, however, it is not clear that the latter factor would reduce the estimates substantially.

The last proposal analyzed for implementing reductions in overtime hours is the case in which the relative prices between workers and hours are changed by reducing the fixed-costs of employing new workers, as opposed to increasing the overtime wage premium. Considering Tables 14, 15, and 16, the employment effects of implementing such a marginal employment subsidy seem encouraging. Even a modest subsidy of $300 per worker hired results in a 0.6 per cent increase in the employment of paid workers. Larger subsidies of $400 to $500 result in employment increases of 0.8 per cent and 1.0 per cent respectively. We note, moreover, that a large part of the employment response comes from the scale effect of reducing labour costs (and hence the firm moves down its labour-demand curve) as opposed to a substitution effect from changing the relative prices between workers and hours.

One policy we have not analyzed quantitatively is the more extensive use of permits by the ministry. Our earlier comments and the Appendix A on special permits have made clear that it is our view that the permits (and hence the limits on hours of work) have played only a limited role to date. Moreover, we have suggested that a complaints-initiated system is unlikely to have much impact unless one of the parties has something to gain by reporting abuse, and it is frequently not clear whether anyone will gain by reporting

Table 18: Job Creation Estimates of going to triple time after standard hours based on overtime hours of paid workers reported by establishments

INDUSTRY	Elasticity assumed for OT with repect to relative price	Decrease in OT hours per week with triple time after std. hrs.	Number of equivalent jobs at average standard hours	Equivalent jobs as a percent of initial employment	Addition to jobs due to reduced average cost of labour##	Net job increase as a percent of initial employment
Forestry	0.5	3890 hrs	101.3	1.9	72.0	0.6
Mines	0.5	11367 hrs	294.6	1.6	211.5	0.4
Manufacturing	0.5	371083 hrs	9793.3	1.7	6996.7	0.5
Mfg - durable	0.5	202077 hrs	5161.6	1.6	3926.6	0.4
Mfg - non-durable	0.5	166666 hrs	4591.4	1.9	3064.6	0.6
Construction	0.5	39994 hrs	1071.5	1.0	782.1	0.3
Goods Prod Industries		426334 hrs	11260.7	1.6	8062.3	0.5
Transp & Commun	0.755	74112 hrs	1984.3	2.1	571.6	1.5
Trade	0.755	92050 hrs	3295.4	0.9	960.9	0.6
Finance	0.755	7698 hrs	292.6	1.0	85.2	0.7
Commercial	0.755	86555 hrs	3249.9	0.6	949.8	0.4
Services	0.755	260415 hrs	8822.1	0.9	2567.5	0.6
industrial Aggregate	na	686749 hrs	20082.8	1.2	10629.8	0.5

Sources: Employment, overtime, and average hours of work, from Employment, Earnings and Hours, data for hourly paid workers. Fringe Benefit costs as a fraction of wages, are from Thorne, Stevenson and Kellog, 1984. Elasticities are from Ehrenberg and Schuaann, 1982.

excessive use of overtime.[65] Given these compliance issues, therefore, it is not obvious how to evaluate quantitatively any additional policies regarding permits. Clearly one can relate such issues to our earlier discussion of complete elimination of overtime, and this was part of the reason for including calculations such as those in Table 9. These give an idea of the maximum employment increases that might be expected from an extreme, no-exceptions policy. Beyond that, however, the effectiveness of a permit policy seems to us to depend more on the diligence with which one enforces it. For example, rigid enforcement of the permit system (with no additional special permits issued) would probably eliminate most of the hours of work beyond 50, and Table 7 suggests that this might account for about 40 to 50 per cent of all overtime hours.

In closing, we add a few thoughts on a comparison of these policies. It is our view that one should be looking for policies that can be used cyclically -- that can be turned on and off with relative ease.[66] It makes no sense, for example, to try to limit overtime at a time of full employment or over-employment when the unemployment rate cannot be reduced further.[67] New-job subsidies seem very attractive from this perspective, though the overtime premium and special permits could be designed to respond cyclically as well. To make the overtime premium cyclically responsive, however, would probably require it to be an overtime tax rather than an increase in the wage received by the worker (one would expect workers to try to retain a double time premium when the legislative requirement for it is dropped.) There are other reasons, too, why one might want to prevent the extra overtime pay from going to the workers, not the least of which is that the revenue could be used, for example, for a job-creation program.[68]

Permits, too, can theoretically be varied cyclically, but probably not without considerable difficulty. It becomes hard for a government to say, after allowing permits for two or three years, "none this year." Moreover, as discretion is involved, the planning of who should get permits this year becomes quite complex and there would likely be political pressures to influence such decisions.[69]

Although both an overtime premium and overtime restrictions increase the effective cost of labour, the latter creates economic inefficiencies not shared by the former. In the case of restrictions, both the employer for whom overtime is tremendously important and the employer for whom it is of minor importance are prevented from using it (though exemptions for special cases may offset this), while in the case of premiums, those for whom overtime is very valuable, are able, at a price, to continue to use it.

In conclusion, it seems to us that both employment subsidies and increased overtime premiums have something to offer for employment creation. The increased overtime premiums by themselves, however, fail to provide many new jobs because of the offsetting scale effects from the increased cost of labour. The marginal employment subsidy seems to provide more employment response, though not through substitution out of overtime or long hours. A combination policy, with the overtime premium in the form of a tax that raises revenue for an employment subsidy, seems to be an attractive option for further consideration.

NOTES

1. We do not concern ourselves here with jobsharing, which also has a theoretical and empirical literature, as that is covered in another study for this task force.

2. It is, of course, just at this point in the business cycle that governments are most reluctant to do anything to hamper a recovery by making further restrictions or imposing further costs on employers.

3. The issue of whether or not we are in for a long-term dose of technological unemployment itself seems to be a cyclical phenomenon. Department of Finance (1986) cites an interesting reversal by Nobel Prize Winner Wassily Leontief on this issue. From 1982 to 1984 he switched his views from worrying about excessive involuntary unemployment to excessive job-creation that would exceed that which could be absorbed by the labour force.

4. The recent book by Hart (1986a) has outlined in some detail the empirical work he and others have been involved in.

5. Early work on modelling such firm behaviour is Rosen 1968), Ehrenberg (1971), and Nadiri and Rosen (1973).

6. Other items that apply in certain cases are workers' clothing or uniforms, rest areas, showers or cleanup facilities, and the like.

7. See Hart (1986a), Chapter 3 for a discussion of the curvature conditions required to ensure an interior solution.

8. To model the choice of the length of the workday and/or week adequately would seem to require bringing in the preferences of the workers and modelling an equilibrium outcome in the labour market.

9. In the European context, where much of this modelling activity has taken place, there is much less variation in the standard workweek than in Canada (and in some countries it is legislated), and it has been argued that this assumption is probably appropriate for the longer term as well as for the shorter term.

10. See, for example, Hart (1986a), Calmfors and Hoel (1985), and the earlier work of Ehrenberg (1971).

11. See Ehrenberg (1971), Hart (1986), or Calmfors and Hoel (1985).

12. Assuming that factors are normal.

13. One might argue that Nardiri and Rosen's (1972) work constitutes a third strand. They developed and estimated a dynamic system of factor demands but, because of a lack of availability of fixed-cost data at the estimation stage, they did not actually use the fixed-cost to variable-cost ratio.

14. The Laudadio and Percy (1973) paper can also be thought of in this group. It uses time-series industry-level data and consequently has no scale variables either.

15. See Hart (1986a) for references.

16. Assuming the numbers in the Hart and Wilson tables are elasticities as mentioned in the text.

17. It is probably worth pointing out that whether one estimates the system as a whole or whether one estimates an hours or overtime equation, if the same assumptions about functional form are made, then the issue of what is functional form are made, then the issue of what is estimated is an issue of efficiency of the estimates. When Hart and associates estimate their systems, they often impose the Cobb-Douglas structure on their labour-services function and hence have the same model as Ehrenberg and Schumann, though they estimate it slightly differently.

18. See Table 9 for evidence of this.

19. See Hart's discussion, Hart (1986a), Chapter 6.

20. See Hart (1986a) and Employment Standards Branch (1984).

21. The change in the Labour Force Survey questionnaire in the mid-1970s means that this is as long an historical series as is available.

22. The underlining, for emphasis, is ours.

23. The following groups (among others) are excluded by the Regulations made under the Act: professionals such as accountants, dentists, doctors, and engineers; employees whose work is supervisory or managerial in nature, teachers; and commission salespeople. For more details on exclusions; see Employment Standards Branch (1985).

24. This estimate is based on the SEPH data which report that paid workers make up slightly less than half of the total workforce (47 per cent in 1985).

25. Unfortunately, no information is available on the numbers of employees covered by the 100-hour permits. Moreover, since 100-hour permits do not need to be renewed (and have been automatically issued on request), it is not clear how to interpret these numbers. In a steady state, presumably only new firms would need to apply each year.

26. The trends should be meaningful if the degree of noncompliance has remained the same over the period.

27. An easy way of seeing this discrepancy is to look ahead to Table 7, which reports job equivalents of workers usually working longer than 60 hours per week (surely needing permits if in covered industries and if this behaviour is usual) as 23,000. This clearly needs substantial deflation to be made to apply to covered industries only, but even a 75 per cent deflation, leaves this number far in excess of the 522 job equivalents reported in the last column of Table 2 for a comparable year.

28. This is not precisely correct but conveys the flavour of the exercise. The complication is that we have used average hours, which includes the hours of those working long hours (roughly an hour per week on average). We could have calculated a divisor excluding long hours, but then the columns of the tables would not be strictly comparable. In particular, a different divisor would be used when hours over 60 were excluded from the average than when hours over 48 were excluded. As this is meant to be a rough exercise in any event, the consistency across the columns seemed the more important consideration.

29. These are the raw numbers that lie behind the calculations in Table 6.

30. We remind the reader again that this is an upper bound, in the sense that, if a policy could be invented that would cause employers to convert all overtime to new jobs, with no offset because the policy itself increases the average cost of labour, or because workers with the appropriate skills could not be found, then these numbers would be the result.

31. Since increased use of overtime seems to be a recent phenomenon, this timeliness is not without importance. The alternatives to the Ehrenberg and Schumann estimates (which used 1978 date), were Nussbaum and Wise (1978) whose data ended in 1974, and Laudadio and Percy (1973) who used 1966 data.

32. Laudadio and Percy acknowledge that they tried to use some other control variables, such as the quit rate and the absentee rate, but none turned out to be significant. Also, there is some doubt about the comprehensiveness of the fixed-cost data that they used (precise definitions and measurement procedures are not given in the paper). The ratio of fixed costs per week to the overtime hourly wage rate is about 4.5. If one assumes about 40 hours straight time and 2 hours of overtime per week, this would imply that fixed costs relative to the weekly wage bill are about 16 per cent, or about 13.6 per cent of the total wage bill. This is less than half the proportion generated in the Thorne, Stevenson, Kellogg (1984) survey, for example, or the proportions inferred from the Pay Research Bureau and Statistics Canada by Reid (1986).

33. This implies that a change in the overall labour services, with the fixed cost to wage ratio held fixed, will lead to equal proportionate changes in workers and total hours, leaving hours per worker unchanged. This is satisfied, for example, by a Cobb-Douglas type of labour services function. This holotheticity is an untested maintained hypothesis in Ehrenberg and Schumann and in most of the other empirical work we have looked at.

34. Note, Ehrenberg and Schumann estimated the elasticity in a variety of forms. We take these estimates as being most representative for our purposes. It might be argued that the elasticities derived from the regressions with industry code and establishment size dummies are to be preferred. However, those elasticities are somewhat smaller than even the ones used here.

35. For earlier work at the Canada level, see Frank Reid (1986). For Ontario data, see Swimmer, Gunderson and Hyatt (1987).

36. The percentage change in the fixed-cost to wage-ratio between 1.5 and 2.0, because it is a large discrete change, depends very much on the starting point. Taken from 1.5, the change is 1/4, or 25 per cent. Taken from 2.0, the change, instead, is 1/3, or 33.3 per cent. Moreover, we could as easily express the equation given above in terms of the wage to fixed-cost ratio, in which case these changes are reversed, with the change from 1.5 being 33.3 per cent and the change from 2.0 being 25 per cent. As a consequence, we have calculated the change from the average of 1.5 and 2.0, which gives the result in the text of 217 or 28.6 per cent. We note here that Ehrenberg and Schumann use the larger 33.3 per cent change, and this accounts for the somewhat greater responsiveness in their results.

37. The calculations are carried out in greater precision than the numbers in the tables, and attempts to replicate the calculations should allow for (the reader's) round-off error in the average overtime hours per worker reported in Table 9.

38. One can imagine, for example, an employer keeping workers after hours to salvage some of the materials that could be refused in later production. If labour costs of doing this rise, it may no longer be worthwhile to salvage the materials.

39. An approach which we and they recognize as being quite crude.

40. If S is standard hours, W the straight-time wage, OT the initial amount of overtime, and d, the reduction in overtime per worker estimated, then the ratio of the new and old unit wages is given by:

$$r = ((S*W + (OT-d)*2.0*W)/(S+OT-d))/((S*W + OT*1.5W)/S+OT)).$$

see, Ehrenberg and Schumann (1982), p. 33, footnote 1.

41. An obvious problem that arises is that the model we have in mind involves both fixed and variable costs of labour. Should one estimate the implied increase in total labour costs (fixed costs + wage costs) or simply in wage costs? We have taken the view that, to apply the estimated elasticities in the factor-demand literature, we should be using the wage concept that has been used in those studies; if they had used a broader concept of the wage, presumably they would have found different elasticities.

42. Laudadio and Percy (1973) make no allowance for scale effects so made no assumption about this response term.

43. It is worth pointing out that this estimate is primarily based on the U.S. economy. An open economy such as Canada's may be even more sensitive to increases in wages and have an even larger response.

44. These offsets run about half a percentage point and as a consequence are much higher than the estimates mentioned by Ehrenberg and Schumann. The size of change in unit wage costs is quite sensitive to the reduction in overtime hours assumed in the calculation. Their illustrative calculation assumes 3 hours of overtime per week with a reduction of 1.2 hours. Ontario industries use considerably less overtime than this (see Table 9), and the reduction is considerably smaller.

45. This is closer to the elasticity reported by Laudadio and Percy (1973) for manufacturing.

46. The increased cost of labour -- and hence the offset -- is smaller in this case. Previous discussions and notes have already drawn attention to the fact that the larger the reduction in overtime hours when the premium rises, the smaller will be the unit wage cost increase. A firm that can cut back on the more expensive part of labour, overtime hours, will have a smaller overall increase in labour costs.

47. For a similar view see Kalachek (1978).

48. Although Ehrenberg and Schumann do estimate a likely response on this score, they are quite skeptical about the models on which these estimates are based (see note 34). We share their skepticism.

49. Most seem to pay overtime at fewer than 44 hours.

50. It is our impression that it is the unions with an interest in the recall of their unemployed members that most effectively monitor the large union firms and ensure that they seek permits. A union with no unemployed members, and with members that are happy with existing overtime work arrangements, is less likely to bring a complaint under the current legislation.

51. Some workers may find themselves in the unenviable position of making the trade-off of reporting that they are getting only time-and-one-half for overtime (in order to receive more money for recent overtime work), at the potential expense of getting less (or perhaps no) overtime in the future.

52. Presumably overtime is not primarily in the average firms.

53. The number of jobs may be overstated slightly to the extent that employers may replace the overtime hours with individuals working 44 hours per week (or 48 hours, in the case described in Table 13), rather than at standard hours.

54. These are calculated from the numbers of equivalent jobs created net of the offsets, in the last rows of Tables 10, 12, and 13. (Column 3 minus column 5 provides the net jobs in each case.)

55. This is known in the literature as a marginal employment subsidy and has been studied mostly in a macroeconomic context, though see Hart (1986b) for an analysis of such a scheme in the current context.

56. So far, the increase in fixed cost to wage ratio and the increase in unit labour costs could be calculated without any knowledge of the split between fixed costs and variable costs.

57. The TSK data provide estimates from a survey of employers, grouped by industry, on the following fringe benefit items: vacations, statutory holidays, rest periods, jury duty and other paid time off, unemployment insurance premiums, workers' compensation payments, Canada Pension Plan payments, other pension and welfare plans, severance pay, profit sharing, and bonuses. As well, they report total labour compensation. The data are for Canada, but the survey has a strong Ontario bias.

58. It is not really important how we arrive at the size of the subsidy -- there is obviously no unique way to choose it, and others would have done differently. The importance of these tables instead, in our view, lies in the fact that an apparently modest subsidy can have roughly the same or more favourable effects.

59. We obviously take some liberty here by assuming that we can calculate the decrease in the average wage bill that would be equivalent to this subsidy and then apply the elasticity of labour demand to estimate the quantitative response. This is probably no worse than what we (and others) did in the earlier tables when we calculated what the increase in the overtime premium would do to the average unit cost. In both cases, it has to be taken with some caution.

60. In fact, it could be quite attractive to offer such a policy in a counter-cyclical way by proposing that the government pay some fraction of the CPP and/or worker's compensation payments for some limited time for <u>new</u> jobs created.

61. One would need to know at least whether or not each firm uses overtime and the firm's size. Better yet would be knowledge about which processes or sections of the firm use overtime.

62. In fact, the calculation is for all paid overtime. We argue in the earlier sections that this can be thought of as hours beyond about 40.

63. See our earlier comments on the Laudadio and Percy (1973) estimates.

64. Unfortunately, existing data do not offer much scope for producing better estimates. The best one could hope for in the Ontario case would be to use cross-section industry level SEPH data on employment, standard hours, overtime hours, straight-time wages, and overtime wages, and to match (roughly) this with the Thorne, Stevenson, Kellogg data on fringe benefits and the total wage bill. This would allow for estimation along the lines of Laudadio and Percy (1973). To add any data on quit rates, absentee rates, or factors which might condition the production function would require going to other data sources. At best, one would have a few dozen observations (the Thorne, Stevenson, Kellogg, data have only 21 industries and provide a limit here) and a few controls, and would be working at the industry level. Moreover, the Ehrenberg and Schumann (1982) results, and the earlier Ehrenberg (1971) work suggest that the elasticity of overtime with respect to the fixed cost to wage ratio should be allowed to vary across manufacturing and nonmanufacturing sectors.

65. Those who will gain are presumably the unemployed, who are not a party to the activities of the firm. The exception to this, as we noted earlier, is the union which has workers on recall or which enforces the legislation as a matter of its own social policy objectives.

66. We recognize, of course, that there may be times when very long periods of use of such policies are called for, such as with the present sluggish unemployment.

67. One qualification we should add here is that one could seek to limit involuntary overtime (at any time of the cycle) by giving effective refusal rights to employees. We have not studies this as it is outside our mandate.

68. Also, supply-side effects may become important. Older workers with the seniority that gives them overtime may be more reluctant to retire; workers will find it more attractive to think of ways to see that overtime is needed at their place of work, etc. See also the discussion in Ehrenberg (1987).

69. A review of excluded sectors in the current permit system makes one wonder what criteria could have been used in deciding that some industries were more worthy than others to receive exemptions. Why, for example, should the concrete block manufacturing industry be allowed "hours of work as required by an employee." The Act allows exemptions "where the Director is satisfied that the work or the perishable nature of raw material" requires it, but it is hard to see how some of the exemptions fit this mould.

APPENDIX A: SPECIAL PERMITS

Special permits in recent years have been issued for work beyond the 100-hour permit level to the order of about 1 million hours per year (Ontario Ministry of Labour, Employment Standards Branch, annual reports on permits).

There are a number of industries (the ambulance service industry, the asphalt paving industry, the automotive repair industry, the baking industry, the quarry and gravel industry and the mining industry, to give a few examples) that are exempted from the limits on overtime and hence from the special permit legislation, but these do not account for a large fraction of the Ontario workforce.

It seems hard to believe that there is a great deal of compliance with this piece of legislation. There is fairly convincing evidence that much additional overtime is worked that would legally require an overtime permit but for which no permit is issued.

The following calculations have convinced us of this view. Some 144,300 workers in 1985 report in the Labour Force Survey that they have usual weekly hours in excess of 60 (see Table 3). Suppose we consider only these and forget for the moment that there are another 200,000 or so workers who work between 49 and 59 hours. Clearly many of these workers with long hours are not hourly paid workers and are exempted from the hours limits by virtue of supervisory or managerial positions. Suppose, to take an extreme view, we assume that all salaried workers are exempt (this is far from true) and we reduce the 144,300 workers by 55 per cent to account for this (paid workers in Ontario comprised 47 per cent of the workforce in December 1985, according to the Survey of Employment, Payrolls and Hours). This leaves some 64,935 hourly paid workers with hours usually in excess of 60. Of course, some of these are in excluded industries or occupations and some may not require permits for other reasons.[1]

To account for these exclusions, suppose we reduce the number again by 50 per cent. That is, suppose that we make what would seem to be a rather generous assumption, that only 50 per cent of these workers would require special permits to allow their long hours. That would still leave 32,467 for whom one might expect special permits would be required. Since with the 100-hour permits, only hours beyond 50 per week would need a special permit, this would mean that some 10 or more hours per week per worker for, say, 50 weeks per year, would be required in permits. If we assume that those working over 60 hours in fact average 65 hours per week (which seems quite reasonable to us), this amounts to (32,467*15*50 = 24,350,250) about 24 million hours per year. A comparison with the 1 million hours for which special permits have been issued suggests a large compliance gap.[2]

It is hard to imagine how one can bring these figures into line. For example, to assume 60 hours per week rather than 65 would reduce this number by a third (though those working 60 or more hours surely average more than 60 hours per week). Or, one could multiply by 50 weeks per year rather than 52 to allow for holidays, though this would reduce the magnitude by only 4 per cent. Whatever one does, one is left with the clear impression that there are a lot of long hours being worked that require special permits under the current legislation but for which special permits have not been issued.

APPENDIX A: Notes

1. For example, special exemptions are available in the case of emergency repairs. Some allowance might also be made for the fact that some of these workers do not work 60 hours or more per week for the entire year. Usual hours might for some workers refer to what they usually work in some particular season of the year. If the period is short enough, some of these hours might be covered by 100-hour permits. For more details on groups exempt, see Employment Standards Branch, 1984, and 1985.

2. Our own guess is that one could quite reasonably argue for increasing this number of 25 million substantially, mainly because the assumptions of excluding all salaried workers and of assuming an exemption of an additional 50 per cent of paid workers are too generous and because we ignore here the 204,000 workers who usually work between 49 and 59 hours per week. They too would require permits for, say, 4 to 5 hours per week, on average.

APPENDIX B:

THE EMPLOYMENT AND HOURS CHOICE IN CANADIAN MACROECONOMIC MODELS'

This appendix reports on the issue of whether or not any of the existing Canadian macroeconomic models have labour-demand sectors that distinguish between the demand for bodies (employment) and the demand for hours, and whether, if they do, such models could be used to simulate the effects of policies designed to influence hours worked. It is presumed that the main interests in such an exercise are twofold: (a) to estimate the substitution responses of employment to policies designed to reduce hours of work, and (b) to examine any short-run feedback effects that result from putting more people to work. In this latter case, a policy that caused firms to reduce the hours of existing employees and to hire new employees from the pool of the unemployed would be expected to affect transfer payments (UIC and welfare payments in particular), taxes, and, hence, the economy. It is with these two uses in mind that this review has been undertaken.

This appendix is based primarily on the report "The State of the Art in Canadian Macroeconomic Modelling," prepared by Patrick Grady for the Economic Forecasting Division of the Department of Finance in March 1985. Patrick Grady, Andrew Sharpe of the Department of Finance, Patrick Muellar from the Bank of Canada and Someshwar Rso from the Economic Council of Canada were contacted in a phone survey to discover whether, since that report was written, there have been major changes to the models as far as labour demand is concerned. The only major model revision that has occurred is that CANDIDE Model 3.0 is now the current model. The labour-demand sector in that model underwent no major changes, however. In addition, a new version of the model at the Department of Finance is nearing completion. It will make some major changes in the labour sector -- mainly incorporating Labour Force Survey data on labour

supply into the model -- but will not, apparently, incorporate hours-employment tradeoffs of the type we are interested in here.

The Grady survey covers the following models;

1. CANDIDE Model 2.0 (Economic Council)
2. CHASE (Chase Econometrics Ltd.)
3. DRI (Data Resources Canada)
4. FOCUS (Institute for Policy Analysis, University of Toronto)
5. MACE (John Helliwell, University of British Columbia
6. MITM (Conference Board of Canada)
7. RDXF (Research Department, Bank of Canada)
8. QFS (Economic Forecasting Division, Department of Finance)
9. SAM (Research Department, Bank of Canada)
10. TIM (Informetrica)

These seem to include all the well-known Canadian Models, and it seems reasonable for us to confine our remarks to these models.

None of these models views the determination of hours and employees in the fixed cost - variable cost framework. All have a single argument in the production function corresponding to total person-hours (or employment at constant or trend hours). Some of the models make no distinction between employees and hours, and those that do tend to have a trend equation for average weekly hours that can be divided into total labour demand (say, in person-hours) to arrive at employment. The lack of any modelling of fixed costs and variable costs (or any economic determinants of the tradeoff between hours and employment) seems to preclude using the models for the first objective noted above -- estimating the direct substitution responses.[2] However, it may still be useful to examine feedback effects in one of these macroeconomic models, though recognizing that the exercise would be crude at best. It is with this in mind that we comment further on the labour-demand sectors of these macroeconomic models.

CANDIDE, TIM and RDXF have separate equations for average person-hours and employment (though wages only play a direct role in

CANDIDE, as discussed in footnote 1) and have their labour and other factor demands modelled consistently (see the section on Aggregate Supply in Grady, 1985). In addition, Chase and MTFM distinguish between hours and employment, though, as Grady points out, the factor demands in these models are not modelled consistently with the production function, which would seem to be a minimal requirement for the type of analysis of interest here. All of these models treat hours as homogeneous, whether they come from extra employment or from extra hours per worker. If one were to cause average weekly hours to fall in these models, employment would rise in the same proportion. Bearing in mind this limitation, one could reduce average hours and trace through the implications for UIC payments, welfare payments, aggregate demand feedbacks, etc.

In conclusion, we believe that none of the existing macroeconomic models has its labour-demand sector structured in a way that allows one to investigate feedback effects from presumed changes in average hours. This would give some guidance as to whether there are serious repercussions that are missed by the partial equilibrium analysis of this and other studies.

APPENDIX B: NOTES

1. This appendix was written in May/June 1986, in response to a request, for some feedback on these matters. No attempt has been made to update to September 1986.

2. The only model to include any relative price or relative cost variables in the equation to determine average hours seems to be the Economic Council model, CANDIDE, which has average weekly hours by industry determined by trend variables, cycle variables, and average weekly wages. The closest theoretical framework that distinguishes between hours and workers, and that is consistent with this equation, seems to be a cost-minimizing model of demand for hours (the trend and cycle variables can be thought of roughly as holding output constant) where the relative price of hours to fixed costs of employees is included, but with fixed costs constant. If one were to use such a model to analyze hours/employee substitutions it would, however, be inconsistent with the single variable for person-hours used in the production function.

3. One might want to note, however, that CANDIDE and TIM are both designed more for the medium - and long-run than for short-run simulation.

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